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VOL. NO. 52, NO. 6 JUNE, 1926 WHOLE NO. 280

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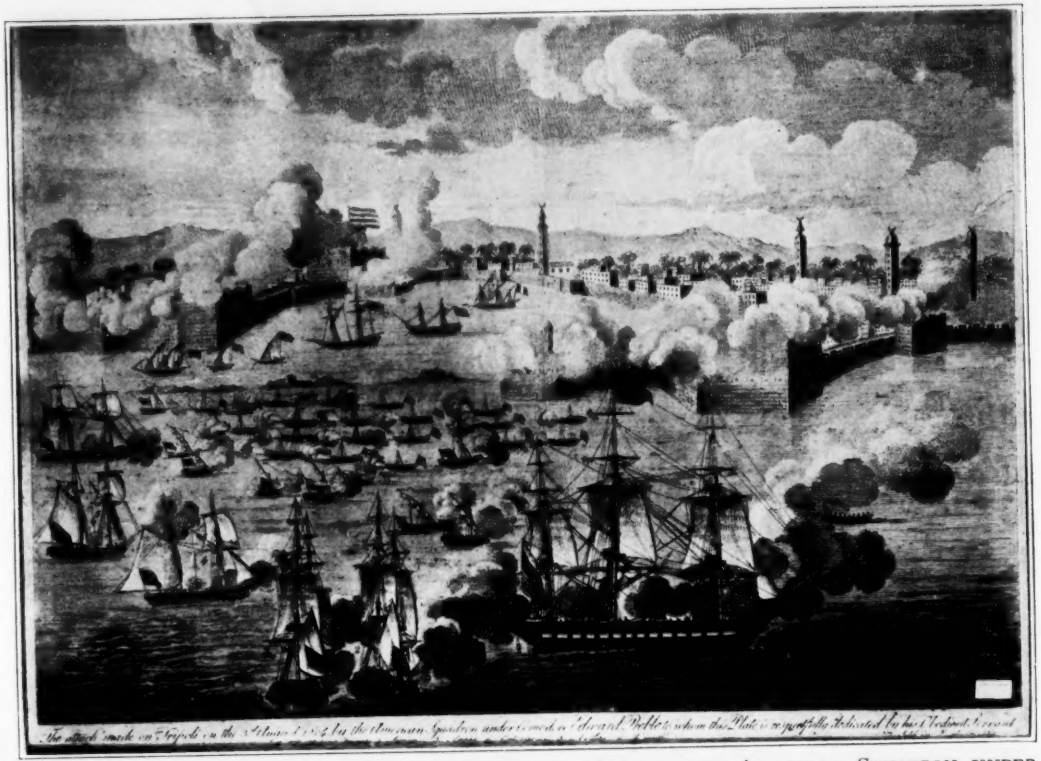

"THE ATTACK MADE ON TRIPOLI ON THE 3D AUGUST, 1804, BY THE AMERICAN SQUADRON UNDER COMMODORE EDWARD PREBLE TO WHOM THIS PLATE IS RESPECTFULLY DEDICATED BY HIS OBEDIENT SERVANT JOHN B. GUERRAZZI"

1. *Constitution Frigate* 2. *Sirion* (Siren) 3. *Arges* (Argus) 4. *Enterprise* 5. *Notlas* (Nautilus)
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THE GREAT SHIPPING PROBLEM

BY CAPTAIN CHARLES CONARD (S.C.), U. S. NAVY

AMONG the economic problems which await solution in this country none is more extraordinary or more puzzling than that involved in the plan to provide an adequate merchant marine. The flourishing trading fleet which existed seventy years ago was lost during the Civil War, and since that time it has seemed impossible to regain our place on the seas. The wealthiest and most enterprising country in the world, with the greatest extent of sea-coast and with a tremendous foreign trade, possessed of all the materials and facilities for ship building and with ample knowledge and skill to turn out as good if not better ships than can be anywhere produced, we nevertheless permit the greater part of our ocean freight to be carried under alien flags.

In the solution of this problem the country is vitally interested. The Navy in time of war is ineffective unless supported by a large fleet of merchant vessels, but our coastwise and special industrial tonnage cannot be drawn on for naval purposes without serious economic disturbance. Our shipbuilding industry is in a depressed condition with apparently no relief in sight. It is, therefore, important to visualize clearly the situation of the merchant marine and to comprehend the basic difficulties which have prevented this country from attaining a commanding position as a shipbuilding and ship operating power. In the following pages a brief description of the difficulties confronting the government-owned fleet will be given and an attempt will be made to review the subject from certain angles, and to indicate what the writer

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regards as the essential elements necessary for the successful building up of a prosperous merchant fleet.

The obstacles to development of our overseas shipping are usually stated to be high wages of American seamen; high construction costs of vessels; hampering legal restrictions, and others of like character. In brief, they may be grouped as arising from the higher standards of living in this country, which makes it difficult for us to compete in production costs with other nations. But such obstacles while undoubtedly serious have been overcome in other industries, and it seems not unreasonable to conclude that, given favorable fundamental conditions, they can be surmounted in shipping.

Plans for the rehabilitation of the American marine have been offered from time to time, based mostly on the granting of subsidies, either directly, or in the shape of discriminatory differential duties on imports brought in American vessels, a policy which had been followed with some success from the time of our very first Congress until 1815. But no matter how the matter was presented it was found that the sentiment of the country was generally against the granting of subsidies in any form, except in the way of mail compensation. Although the tariff act of 1913 allowed a discount of 5 per cent on all merchandise imported in United States vessels, with the proviso that nothing in the act should be so construed as to abrogate or impair treaties concluded between the United States and foreign nations, the discount was later held not operative, by the decision of the Supreme Court, and consequently had no effect in developing our merchant marine.

The war in Europe gave the necessary impetus to the framing of legislation long sought to improve shipping conditions, and the Shipping Act of 1916 was passed with the double object of establishing a regulatory body for the control of shipping and of building up a merchant service. This legislation was amended by the Merchant Marine Act of 1920, under which the fortunes of our overseas shipping are now fostered and directed.

The work of constructing and acquiring the vast number of merchant vessels deemed essential for war purposes was one of those stupendous feats for which history finds few parallels. Much has been written, both commendatory of the accomplishment, and critical of the great sums expended. With those phases of the

subject we are not concerned here. It is the succeeding problems we are now following.

Chairman Hurley, of the Shipping Board, on March 27, 1919, stated that the various plans for operating the American merchant marine could be classified as follows:

1) Government ownership and operation.
2) Government ownership, and operation for the benefit of the Government through the medium of a private corporation.
3) Government ownership, and private operation for government account.
4) Government ownership, and private operation for private account.
5) Ownership by a single private corporation.
6) Private ownership and operation.

Each of these six plans has had advocates, and each, excepting (5), has had a trial, for parts of the fleet at least. As none of them has made a record which indicates the possibility of a satisfactory solution, the situation has reached a sort of impasse in which no definite policy can be considered to be in sight.

The arguments for and against government ownership of the fleet created under war conditions have been presented many times. In favor of continued national control it is urged that the ships should be used to develop the commerce of the nation as a whole, and that they should, if necessary, be placed on trade routes which might temporarily prove unprofitable but that ultimately would show valuable results in increased foreign commerce. Private companies could not be expected to serve the national interest in this way. On the other hand, it is pointed out that only alert, resourceful and energetic men, working under the incentive of private gain, can have the initiative and business genius necessary properly to develop an efficient merchant marine. Of late years this latter view has appeared to predominate, but as yet no means have been found to induce private capital to take over the task.

In an address before the Twelfth National Foreign Trade Convention, in June 1925, Leigh C. Palmer, then President of the Emergency Fleet Corporation, gave figures which illustrated the existing situation. A year previous there were in operation about 320 cargo vessels at a loss of more than $25,000 per voyage. This loss had been reduced to $17,000, under improved administration, and it was contemplated that the loss per voyage could be further reduced to $8,500. This did not, however, include interest and

depreciation charges, which when added would bring the prospective voyage loss to about $13,500. He believed that the average private American owner of the tonnage in question could reduce that loss to about $4,500, and further, that the same fleet in similar services, if operated under British conditions would about break even. Consequently, taking this last figure as an approximate measure of the amount of government aid needed to place privately owned American vessels on a competitive footing with British vessels, he arrived at an estimate of $7,500,000 per year as the amount of annual subsidy required. As this was for cargo vessels alone, he added another $7,500,000 for passenger and mail lines, as naval defense and mail subventions, making $15,000,000 per year as government aid necessary to put the American merchant marine on a competitive footing. On the other hand, continued government operation, including necessary replacements, he placed at $40,000,000 per year. These figures are thoroughly conservative and indicate the best that may be hoped for under existing conditions.

As already stated, the granting of subsidies, in whatever form proposed, has not met with popular approval. While advocates of such a course refer to the fact that in our earliest history (1789 to 1815) discriminating duties were successful in results obtained, it must be remembered that this policy was adopted in retaliation, with the object of forcing other nations to remove their restrictions on American commerce. As soon as these restrictions were removed by treaties, the discrimating duties were abolished. Reference has already been made to the unsuccessful attempt contained in the Tariff Act of 1913 to apply discriminating duties. The Merchant Marine Act of 1920 contains three sections intended to grant advantages to the American marine. Section 21 provides for the extension of the coastwise shipping laws to the island territories and possessions of the United States. Although the proviso has been carried out in the comparatively unimportant cases of Guam, Tutuila, and the Virgin Islands, it has not been found practical to apply it to the Philippine Islands, as in that case the law required the President to declare by proclamation, prior to placing the section into effect, that an adequate shipping service had been established. This was one of a series of efforts to exclude foreign vessels from the Philippine trade, and so far has not borne fruit. The fear of retaliation on the part of other nations, who might

naturally close their colonies to our trade, as well as the desire to live up to our "open door" policy seems likely to defeat the purpose of this section.

Section 28 of the same act attempted to restrict the special import and export rates of the railroads, in conjunction with ocean shipments, so that they could be applicable only in cases where the ocean carrying was in American vessels. This section was placed in effect temporarily, but became inoperative when the Shipping Board found it wise to revoke its certification that shipping facilities under the American flag were adequate.

Section 34 provided for the abrogation of treaties which restrict the right of the United States to impose discriminating duties. It authorized and directed the President to take the necessary action, but he has never done so.

The above instances have been cited to show the apparent hopelessness of arriving at a satisfactory method of solving the shipping problem by means of direct government aid, subsidy, or subvention. It seems extremely doubtful that Congress will again legislate in that direction; the recent failure of a shipping bill containing subsidy features emphasizes this point.

The Government still continues to operate its merchant fleet at a loss, at the same time disposing of vessels to private owners when ever opportunity offers. By careful management and improvement of conditions the loss per voyage can be, and is being reduced. Removal of ships from the least remunerative lines is a step in that direction. But this gives rise to a sharp division of policy. The preamble to the Merchant Marine Act of 1920 states:

> That it is necessary for the national defense and for the proper growth of its foreign and domestic commerce that the United States shall have a merchant marine of the best equipped and most suitable types of vessels sufficient to carry the greater portion of its commerce and serve as a naval or military auxiliary in time of war or national emergency, ultimately to be owned and operated privately by citizens of the United States; and it is hereby declared to be the policy of the United States to do whatever may be necessary to develop and encourage the maintenance of such a merchant marine.

Consequently, reduction of ships in service for the purpose of effecting economy may well be considered in opposition to this declaration.

Assume, however, that the policy of restricting the number of vessels operated be followed, so that only the lines showing the

minimum loss, together with those showing an actual gain be maintained in service. And further, assume that by continued study of conditions the ships actually operated commenced to show a net gain. This could be brought about only by using the vessels over the most remunerative trade routes, where competition is naturally the keenest. As a result, rates over those routes would drop, and as our most efficient competitors admittedly have a greater margin of profit in operating than we have, our ships would find it practically impossible to maintain the contest, unless some modification of conditions should occur.

What changes in the economic situation are likely to take place, which will enable our merchant marine to develop?

If we study the history of the various peoples who have attained supremacy in maritime affairs in the past, two conditions are found to have existed, either one or both of which have invariably been the underlying causes for the growth of the sea-carrying power. In one case the people, city, or nation concerned was so situated as to be on a natural channel of trade, where sea-carrying was the normal development of a commerce already partially established. The merchant fleets of Rhodes and Venice are examples of this condition. In both instances trade between the Levant and western Europe was actually passing their doors, and it was only necessary for an energetic people to see the opportunity and seize it. By the establishment of great depots, and by the building up of fleets of vessels to fill a demand for carrying space which grew ever greater as the trade was systematized and controlled, both the Rhodians and later the Venetians obtained the mastery in the field where their especially fortunate locations enabled them to outstrip all competitors. The Phoenicians also benefited from their location, although in their day they had to build up the western routes which had not existed before they undertook to carry Levantine wares along the Mediterranean shores. But the real cause underlying the growth of Phoenician sea-carrying power was the urgent need of the people of that nation to secure for themselves the products of other countries, and these products could best be secured via the sea route. This second cause will be found to be the root of the development of maritime-carrying trade in every subsequent nation's sea supremacy, except in the peculiar circumstances exemplified by Rhodes and Venice.

Consider the situation existing at the time of the inception and growth of the Hanseatic League. It was not because the cities and towns of the Baltic and north German regions produced so much in excess of their own needs that they desired to band together for the easier and more certain disposition of their products in other lands. The urge for combination and development of trading procedure arose from the desire of the inhabitants of the Hanseatic regions to secure the manufactured articles and luxuries of western and southern Europe, which they could not produce themselves, and for which they were willing to exchange the raw materials, the furs, the fish, the forestry products, etc., native to their districts. To effect these exchanges it was necessary to build up fleets of vessels, as the sea routes offered the best and cheapest carriage available.

The Portuguese, in their epoch making series of voyages along the west coast of Africa in the fifteenth century, culminating in the rounding of the Cape of Good Hope and arrival in India, were actuated no doubt in part by the love of exploration, stimulated by Prince Henry the Navigator. But the real underlying motive was the great profits secured from the products obtained along the African coast, as voyages were extended further and further south. Add to this the hope, finally realized, of reaching the rich storehouse of India unhampered by the tolls and difficulties of the land routes, and we have the full explanation of the spirit which could endure for so many years the hardships of exploration and could brave the risks, real and imaginary, of advancing through seas filled with threats of disaster. In the following century Portugal reaped a rich reward in the building up of a commercial sea power unexcelled by other nations, and had a virtual monopoly in the importation of spices, drugs, dyes, and India manufactures. It is clear that her sea power rested on the rich imports made possible by her explorations, which gave her a start on other nations. Certainly it was not due to her desire or ability to export her own products, for she virtually had none. She obtained from other countries the wares she sent out to the East.

The case of Spain well illustrates the results of a wrong and mistaken policy upon the well-being of a country. The great Spanish Empire under Charles V, embracing a large part of the richest provinces of Europe, gained for Spain a remarkable prosperity, and the Spanish industrial organization developed rapidly.

Shipping grew in importance, expecially between the home country and her colonies. Then came the expulsion of the Moors about 1609. These people had been the greatest economic asset of the country, and their loss paralyzed industry. Heavy and ignorant systems of taxation restricted trade. Regulations controlling the trade to appointed fleets harrassed the free movement of cargoes. At the root of the trouble was the belief that true wealth consisted in the accumulation of the precious metals, and the rich stores of silver and gold discovered in Mexico and Peru overshadowed in importance all other considerations. Everything was shaped to bring this treasure home. Shipping was devoted to that purpose. Colonists were prevented or discouraged from developing the resources of the new countries. The consequence was that but little was imported into Spain from her colonies. Exports, therefore, found a poor market in the new world. Shipping diminished to fleets of treasure ships, which, it they succeeded in getting by the Dutch and English raiders, brought to Spain precious metals soon dissipated in the procurement of necessities from European neighbors.

The leading position of Dutch shipping in the seventeenth century was without question due to the economic urge inciting the Dutch people to import the products of many and distant lands, including their far eastern colonies. Having achieved independence from Spain, after a struggle in which commercial as well as patriotic reasons played a part, the Dutch developed enterprises which involved many features of modern business affairs, including speculation in stocks, commercial crises, pools, and "trusts." Industries and manufactures flourished, and large commercial establishments grew up, but all this was only possible on the basis of a constant incoming flow of foreign products and to transport these products the Dutch furnished the ships. Here again we find, first an intelligent and industrious people anxious to expand and enjoy the products of other lands, and second the achievement of their purpose through fostering of shipping in order to bring those products to their country. The increase of internal commerce and manufacturing was the natural consequence of these conditions, and furnished the volume of exportable surplus necessary to procure the desired imports.

England offers a most illuminating example of the part played by imports in the development of shipping. Obsessed originally

with the "mercantilist" theory that a country would make money if it sold more merchandise to foreigners than it bought from them, so that the balance would be made up in coin or bullion, the British, during the Middle ages, allowed foreigners to monopolize sea carrying. But during the sixteenth century England began to reap the benefit of her wise colonial policy, in which, unlike Spain, she encouraged the agricultural and industrial features of her possessions, with the result that products from abroad reached her in increasing volume, to the great benefit of her expanding population. Then began the struggle with the Dutch for control of shipping. This continued, with advantage in favor of the Dutch, until the Navigation Act under Cromwell in 1651 tipped the scales in England's favor. Under that act goods from a European country could be brought to England only in English ships or in ships of the exporting country, while the products of other continents could be imported or exported only in English ships. This policy was bitterly contested, and has since been abandoned as being no longer necessary, but English shipping benefited enormously at the time, even though the country was involved in several wars more or less directly attributable to it.

In the years following the repeal of the Corn Laws and the establishment of free trade, English foreign trade, which has reached tremendous volume, has shown a continuing excess of imports over exports, while at the same time the growth of her merchant marine has placed her in an unchallenged position in this respect. The excess of imports is, of course, accounted for first by the fact that as a creditor country she receives heavy interest payments from abroad; second, as a ship-owning country, she furnishes the service of freight and passenger carrying; and third, as the financial center of the world she earns large commissions in adjusting trade settlements. All of these cause a certain flow of imports not balanced by a corresponding value of exports. The important fact, however, which it is desired to stress here, is that excess of imports has unfailingly paralleled a flourishing merchant marine.

Coming now to the history of our own country, the facts are as follows. During the first half of the nineteenth century, when American shipping was in its most flourishing period, the shipping interests were confined almost exclusively to the north. New England ship masters sailed to every part of the world, rounding both Cape Horn and the Cape of Good Hope on their voyages to

the Pacific and Indian Oceans. They were foremost in the China trade, and when the gold rush to California started, fast packets were placed on the route around the Horn. Few episodes of our national life surpass in interest the marine developments of this period.

At that time the northern states imported far more than they exported. In fact only about one-third of the total exports of the country came from the north. The other two-thirds were made up mainly by shipments of cotton from the southern states. Except for cotton, the excess of imports over exports for the country as a whole was great. Consequently American shipping flourished. The explanation is clear. New England shipbuilders did not build the best and fastest ships in the world, and Yankee skippers did not drive those ships through every charted sea with the idea of finding a market for American products. The impelling motive lay in the desire for foreign produced goods for which a ready market could be found at home, with immense profits. Of course it was necessary to speed production of domestic articles to use in payment, that is, the exportable surplus had to be provided. But so far as the north was concerned—and that was the center of shipping—excess of imports, as always in history, accompanied a flourishing merchant marine.

During the last half of the nineteenth century the internal development of this country was prodigious. Heavy investments of foreign capital, commencing well before the middle of the century, particularly in railroads, canals, agriculture, and mining, aided an expansion of our internal resources which has never been equalled. Our reliance on foreign products greatly lessened. At the same time, as a debtor nation, it was necessary for us to send a considerable value of exports abroad in payment of interest. Therefore, the balance of trade became favorable, that is, our exports exceeded our imports. It is well known how our merchant marine, in foreign trade, depleted by the Civil War, became practically extinct. Many factors contributed to this result, the change from wooden to iron or steel vessels and the development of steam propulsion, in which the British took a leading part, being usually cited as the underlying reasons. Actually, this country, producing most of its necessities within its own borders, was not impelled to seek the products of other countries, and so, under the changing

conditions in the merchant service, was not interested in rebuilding its merchant marine. On the other hand the British, always with an "adverse" balance of trade, found it imperative to keep in the forefront of marine development. Only by furnishing the main part of the transportation by which the products of the world were gathered into British ports in exchange for coal and manufactures, together with financial and transportation services, could England insure the constant and most economical flow of the merchandise on which her existence depended.

The phenomenal rise of German shipping in the years preceding the World War has often been pointed to as the result of the fostering care of the German Government, which permitted industrial combinations (Cartels) and encouraged in every way the development of foreign markets. It should not be overlooked, however, that during the entire time in which the upbuilding of the German merchant marine was proceeding the imports of Germany considerably exceeded her exports.

The general conclusion may then fairly be reached that excess of imports over exports constitutes a condition favorable to the expansion of a merchant marine. Where a nation has as its prime objective the gathering of the products of other lands into its borders, that nation will provide the carrying facilities, in order to receive in the most economical manner the desired goods, and also to insure the steady and uninterrupted flow, not only of these imports, but also of the exportable objects sent out in payment. One of the main elements of economy under these circumstances is that the quantity of imports furnishes the measure of carrying space required. Consequently, vessels with return cargoes assured, when leaving home ports load to as near capacity as possible with exports assembled under familiar domestic conditions, and have the advantage of practically balanced cargoes. But where the quantity of exports governs the space, the problem of securing return cargoes in foreign lands is much more difficult and uncertain.

The great difficulty confronting the operators of shipping-board vessels is in securing adequate and remunerative return cargoes. The average loss per voyage is in most cases due to lack of revenue on this account. Thus, a typical voyage between Baltimore and Liverpool in 1924 (average results) shows:

Revenue, outbound	$23,590.00
Revenue, inbound	3,350.00
Total	$26,940.00
Expenses	$43,558.00
Loss	$16,618.00

Had the revenue inbound equalled the revenue outbound, the total would have been $47,180, and a gain of $4,622 would have resulted, instead of the loss shown above.

The Meaning of Foreign Trade Balances

If the trade between a country and foreign nations consisted in a simple exchange of goods, it is evident that over a series of years the value of exports would equal the value of imports. If credit and monetary relations are introduced, so that each lot of goods is exchanged not for an equivalent value of goods, but under a system of credits controlled by international commercial exchange, it could well happen that at the end of a stated period a country would find that its total exports exceeded its imports or vice versa. The balance would then tend to be extinguished by a subsequent increase of exports from the debtor to the creditor countries, or by shipments of gold and silver. However, there are other factors than the exchange of goods to be considered. These are called the "invisible items" of exchange and consist in payments for interest and dividends, ocean freights, government settlements, tourist expenditures, immigrants' remittances, charitable and missionary expenditures, foreign insurance, etc. The amounts involved in these intangible items are all thrown into the equation before the balance is struck. The resulting excess, if any, must be settled:

1) By shipment of gold or silver.
2) By transfer of securities.
3) By granting of loans from the government or people of the creditor country to the governments or peoples of the debtor countries.
4) By sufficient changes in the net value of the invisible items.
5) By additional transfer of goods from debtor to creditor countries.

This brief description is inserted for the benefit of readers who may not be familiar with foreign trade conditions, in order that the following discussion may be clearer. It is necessarily incomplete, as the subject is an intricate one. For example, there has been left out the possibility of transfer of services, as when the

government or people of one country perform services for the benefit of the government or people of another country; and the possibility of the transfer of title to territory has also been omitted. These are so rare that they need not be considered.

As has been pointed out, during the last half of the nineteenth century this country had a "favorable" balance of trade, that is, our exports exceeded our imports, and during this period our merchant marine was at its lowest ebb. In this century exports have exceeded imports up to the present time, and our efforts during the last decade to build up our shipping have been put forth under circumstances extremely adverse to success, if the theory here developed be accepted. The artificial conditions brought on by the war have, however, accounted for such advance in shipping as has been made. Let us now examine the probable trend of events and endeavor to make a forecast of the foreign trade conditions which will exist in coming years.

Whereas in pre-war years we were a debtor nation, we are now a creditor nation. European governments owe our government approximately $12,000,000,000. In addition, foreign governmental and private debts to American citizens amount to over $9,000,000,000. Offsetting this total of $21,000,000,000 must be considered $4,000,000,000 of credits and investments held by foreigners in this country, making a net figure of $17,000,000,000 owed by foreigners to us.

During the last ten years our aggregate excess of exports over imports (including movements of gold and silver), has also amounted to approximately $21,000,000,000, indicating that the debt piled up during the same period was in the shape of goods delivered abroad, over and above the value of goods received by us. This must be modified by consideration of the "invisible items" in the international trade balances. Also must be considered whether or not the estimated $4,000,000,000 owed by us abroad has been increased or diminished during the same period of time.

We know that during the war investments in this country by foreigners were considerably reduced, that is, securities were returned to us to help offset the heavy shipment of goods abroad. Since then, however, foreign investments in this country have been made in great amounts, and it is not improbable that the pre-war total may have been again reached. In that case this element would be practically eliminated in this connection.

Notwithstanding the fact that we are now heavily a creditor nation our exports continue to exceed our imports. In 1923 the excess dropped to $375,000,000, but in 1924 it rose again to $980,000,000, and in 1925 it was approximately $680,000,000. This is explained by the fact that our citizens are continuing to make a vast volume of foreign loans, the total for 1924 having been approximately $1,000,000,000, and for 1925 somewhat over that amount. In other words, in order to sustain the excess value of our exports it has been necessary to grant credits abroad, since the balancing value of imports has not been secured.

Economists are agreed that this condition of affairs cannot continue indefinitely. Eventually the tide must turn, and that in the not far distant future. Foreign governments, commencing with Great Britain, are now funding their debts to our government, and the payment of principal and interest on that account will gradually swell the volume of our imports. Investments abroad by our nationals will doubtless continue, but each such investment starts a new series of interest payments and these before long must play an important part in trade balances. Even though repayments of principal be long deferred, yet finally this country must accept its position of a creditor nation, and see an "adverse" balance of trade established. When that time arrives—and it should be within the next ten years—our shipping problem will find its solution.

Under these circumstances, how should the coming change be prepared for? Are there not steps which might be taken to render the transition from a "favorable" to an "adverse" trade position a change with little or no economic shock? The following described steps are suggested:

Let it be the policy of the Department of Commerce and of the various chambers of commerce, foreign trade conventions, etc., to study thoroughly the field of foreign produced goods with the purpose of selecting and encouraging the production abroad of those articles, principally raw materials, which can best be received into this country with the least disorganization of domestic industry. Devote some of the energy now expended in finding foreign markets for our goods to scientific investigation of the possibility of securing from foreign areas cheaper materials than we can produce ourselves, to the benefit of our manufacturers who transform raw materials into finished goods, and above all, to the benefit of the great body of our population, the ultimate con-

sumers. Further, if certain articles can be manufactured abroad more cheaply than in this country, let us, where possible, encourage the importation of those articles, provided adequate measures can be taken to switch the domestic industries to some other more useful lines of endeavor. Such steps as these should be taken with due regard to the necessity for preserving essential industries, that is, industries whose products would be essential to us in time of war. But where cheaply produced imports can be encouraged whose loss in war time would not affect our ability to carry on military operations, it would be a direct economic benefit to receive them under peace conditions.

In the eighteenth century there was a great outcry from English cotton print manufacturers over the importations of Indian produced cotton goods. Yet eventually, by a slight shift in the character of the cotton prints, English manufacturers were able to supply the Indian markets, and Indian cotton goods still came into England. In many cases the importation of manufactured ware was prohibited in England, as was the exportation of wool. An Englishman could be buried only in a woolen shroud; a Scotchman only in Scotch linen. These antiquated ideas of foreign trade have left their effect upon us though we know better. It is time to modify them considerably.

The truth is that the encouragement of foreign industries by the importation of foreign goods adds to the prosperity of the foreign countries concerned and thus broadens the market for our own surplus products. The more heavily we draw from abroad, the less attention need we pay to developing foreign markets—they develop of themselves. However, no matter what opinion may be held regarding the correctness of this viewpoint, there can be very little doubt that we are confronted with the problem either of assimilating a greater value of imports, or of suffering a reduction of exports. A judicious preparation for the changed conditions seems advisable.

While in recent years legislation has provided for foreign banking, and has permitted combinations for engaging in export trade, more is needed. There should be authorized and assisted by governmental action the formation of great trading corporations, empowered to cultivate the importation of foreign goods, to establish banking facilities abroad, to own and operate merchant vessels under the American flag, to establish foreign trade zones (free

ports), and in fact to do all things necessary for developing foreign trading. The advantages to be expected from doing business in this manner may be explained as follows:

Assume that in a given country it is found that certain raw materials are produced, or can be produced, which would find a market in the country. Company A is an importing firm which would like to handle these products. Company B is a firm of bankers. Company C is a ship-operating firm. And Company D is an exporting firm seeking foreign markets. Company A would undertake the importation of the products provided there were banking facilities in the given country to aid the producers with long time credits, discounts, etc., and provided also that shipping facilities were assured. In the absence of these, Company A can do nothing. Company B would establish a banking agency in the country if trade warranted it. Company C would establish a line of vessels to the country if freight were available. Company D would export products there if the country were sufficiently prosperous to absorb them. Working independently these companies would be unable to undertake the development in question. But if Company ABCD combined all these functions it could handle the situation with profit. A loss in one or more departments in the early stages of the undertaking would not be serious, if a sufficient net profit on the whole business were obtained. Thus, the shipping end, considered alone, might show a book loss. But since the transportation is essential to the success of the business, such loss would not invalidate the scheme. Eventually, of course, all departments would show a profit, under proper administration.

It is unnecessary to enlarge further on this idea, thus roughly set forth, as its truth is self evident. Such combinations of industry may aptly be termed "Combinations for development of trade" in contra-distinction to the well known "Combinations in restraint of trade."

A summary of the situation is, then, as follows: All nations which have attained a commanding position in merchant shipping have done so either because of exceptionally favorable location on trade routes (and this has been rare), or have desired and encouraged imports in excess of exports.

In the United States imports will in all likelihood exceed exports in the near future. In order to harmonize with this situation

scientific preparation should be made, so that economic selection of the goods to be assimilated may be developed.

Legislation permitting and encouraging the formation of foreign trading corporations should be enacted. Shipping under the American flag should be required of these corporations.

It would appear, therefore, that the shipping problem is not one which can be solved by consideration of shipping alone. In fact, it is so involved with the general economic web of foreign trade, that only a proper solution of that larger problem can carry with it a satisfactory termination of the difficulties with which the American Merchant Marine is confronted.

THE PLACE OF AVIATION IN THE ORGANIZATION FOR WAR

By Captain Yates Stirling, Jr., U. S. Navy

"Alis Volat Propriis"

Editor's Note: Submitted in the Prize Essay Contest, 1926. Although not awarded the prize or honorable mention, the article was considered so important by the Board of Control it was decided that it should be published in the Proceedings.

The Control of the Surface: "The nation that rules the seas also rules the world," is a dictum confirmed by history. There are those who would change this to read: "The nation that rules the air also rules the world." They make the claim that in ruling the air, likewise the sea and land are ruled. There is some truth in this thought. Yet, not the whole truth. The air above the sea cannot be ruled by either the airplane or the warship except through coordinate action and the air above the land cannot be ruled except through coordinate action of the airplane and the dwellers upon the earth.

The airplane is merely a missile. It is fired from the surface of the earth or sea and returns thereto in due time. The "plane surface" of the earth or sea must be controlled if the air missile is to have adequate mobility. The surface of the earth and sea is the base of operations, containing all the materials for the supply of these air missiles and of those who ride them. The control of this surface or plane must ever be the vital objective in war. Land forces will accomplish the control of the plane ashore while the war fleet will gain this end at sea. Upon this foundation, we can build successfully and gain control of the air.

Air Power: In discussing the question of air power, it will be well first to endeavor to define it. The terms land power and sea power are well enough understood. They define the military power controlling communications by land and the naval power controlling communications by sea. By analogy, then, air power should be defined as the power controlling communications by air.

Communications by land and by sea are an economic need. Communications by air, however, are not at the present moment, nor can they be considered in the near future a vital economic need to any nation. Yet, land communications and sea communications can be interrupted or destroyed by attacks from the air or by the instruments of air power. Thus it is evident that, until air communications have become a vital economic factor in the life of the nation, the instruments of air power, which are the airship and the airplane, will be utilized to control the two vital communications; land and sea must therefore cooperate and fight side by side with armies and navies to that end. Air power must conform to the rules governing war on land and sea, for the land and sea aims are the objectives of air power.

Visions of a time when the skies will be filled with airships and air planes speeding through the atmosphere at a hundred or two hundred miles an hour, carrying a large share of the world's traffic in persons and goods, when communication by air has become a vital economic factor in our life, to lose which must spell economic downfall to a nation, are premature, and can hardly be realized, if ever, for many years to come.

Air power, being still an adjunct, not having evolved into a prime factor in the economic life of the world, cannot yet claim supremacy over, or even equality to the powers of land and sea.

Airways: All instruments of war are dependent for their continuous operation upon some sort of base for refit and supply. The instrument least dependent is the capital ship and the most dependent is the newest weapon, the airplane.

Although the ship upon the sea and the airplane in the air apparently do not require the building of a road on which to travel as do vehicles on land, yet it is not a wide stretch of the imagination to say that each does require a road. If a ship should start out without preparation being made to receive it at a protected harbor and there refuel and supply it, the ship would become stranded after its fuel was exhausted. So it is with the airplane; if a pilot did not know where he could land and renew vital needs for an additional hop, the airplane would be lost.

On shore, landing fields and service stations at different localities give a mobility to the airplane that it otherwise would not have. Properly spaced landing places, and suitable meteorological conditions made it possible for airplanes to travel around the

world. When we come to the open sea, we find difficulty in providing suitable places where airplanes can renew their vitality and proceed on their flight. A landing field at sea is an expensive creation. It is called an airplane carrier. Safety against attack demands of it high speed and mobility. An airplane carrier must be large enough to provide space for taking off and landing of airplanes. Due to the expense of building such ships, nations naturally are limited in the number they may possess. If the airplane is a seaplane, then, provided weather and sea conditions permit, it can alight on the sea and be refueled and supplied by a surface vessel. It also can be hoisted on board by a surface vessel and carried to a destination. The ship, therefore, is the service station for airplanes that are in flight over the sea.

The land problem and the sea problem of the airplane are quite distinct and separate. When an air force goes to sea, it must be carried on the backs of the vessels of the fleet. The aircraft carrier alone has the facility for both flight and the return of the airplane. All other types of vessels may insure a safe departure, but cannot insure a safe return. If the water is rough, the plane may be lost. This is a distinct handicap and disadvantage, and must lead to structural changes in all surface ships to afford the airplane a chance of being able to land on board a ship at sea after its flight has been completed.

Where an objective can be approached almost entirely over land, such a route will be selected by airplanes for attack upon an enemy. Where the only approach is over sea, and where the intervening water distance between the contending forces and their objectives is such that airplanes carrying a war load of explosives cannot safely make the transit and return, the airplanes will be carried in ships. These ships are vulnerable to attack by gun fire, torpedo fire, and to the hazard of the mine. They will require the panoply of a fleet for protection. As the air is a most useful medium for the carrying of missiles to drop upon an enemy, every ship in that fleet also will carry airplanes. It is reasonable to suppose that such an enemy fleet bringing airplanes will be the objective of our fleet, similarly equipped. A sea battle will be inevitable. It must be, therefore, that the airplane at sea has not in the least changed the objectives of warfare on the sea. An additional weapon, a very formidable one, has been added to the fleet. Heretofore, when two fleets were approaching one another

with battle intent, naval strategy and tactics conceived the idea of destroyer attack upon the other. To this end the enemy fleet was located and tracked, and the small torpedo-carrying vessels were directed to attack at a time expedient and advantageous, usually simultaneously with the action. In addition to such attack by destroyers and submarines, the fleets of the future will endeavor to clear the air of enemy aircraft. Long before the two fleets are in sight, aircraft from carriers will be flown. The margin of airplane superiority at this time will have a decisive effect upon the battle. The fleet without airplanes will be unable properly to control gun fire at long ranges, and will have to depend entirely upon anti-aircraft fire to ward off the attacks of bombers, torpedo planes, and fighting planes with light bombs of both high explosive and gas. We must consider very definitely what on board ship we are willing to sacrifice in order to supply more space for airplanes.

When we consider coast defense which logically is a naval service when the direction of attack is from the sea, the airplane has not rendered obsolete those instruments of the past, as some persons would lead us to believe. The gun is yet a necessary and vital weapon for short range defense within fifteen or twenty miles. The submarine with its torpedo is a longer radius gun and the airplane with the bomb is a further weapon of defense and with a greater range, carrying the defense several hundred miles to sea.

As the nations in conference assembled vote to limit the number of surface or subsurface warships in fleets, the war value of merchant ships enhances by reason of their availability as aircraft carriers. If we abolish all warships, then the control of the plane of war operations at sea will go to the nation with the most effective merchant marine, carrying airplanes to win control of the air above them.

Strategy and Tactics of the Naval Airplane: The notion that the airplane is to replace that panoply of war called fleets came as a surprise to the Navy. The naval man saw in it merely a weapon to be used by the Navy for offensive and defensive action. The Navy early recognized that airplane development for use on the sea offered a means of accomplishing certain ends, which, without airplanes would be impossible. In addition to its value in scouting, the Navy's interest first was directed to the airplane for the purpose of spotting gun fire. Gunnery men knew that in a

fleet action, ability to hit at the longest ranges possible would be a distinct achievement. The water line of a target was known to be practically invisible to observers on board the battleships at about seventeen or eighteen thousand yards. Accurate spotting from ships at these long ranges was impossible. Ammunition was too precious to waste unless a fair proportion of hitting could be obtained. Spotting the gun salvos from airplanes was the natural solution and this art has been developed in the fleet to a high degree of accuracy. A type of airplane for spotting purposes has been designed, capable of slow flying over the target and with endurance in the air sufficient to last out a naval action. Short endurance airplanes would not do, for a delay in opening fire that might readily be forced by an enemy would nullify airplane spotting in causing planes to return for more fuel at a critical time. Inasmuch as these special planes will be engaged exclusively in spotting, they must be protected from the attacks of enemy fighting planes. To give this protection, the Navy will escort its spotting planes with fighting planes. A spotting plane should feel perfectly confident that the fighting planes can protect it; otherwise the morale of the aviator will be seriously menaced and accurate spotting will be impossible. The fighting plane for this escort work also must be capable of remaining in the air a maximum time consistent with its high speed. An enemy will use its fighting planes to interrupt the spotting over its own fleet by shooting down spotting planes. Success in this will be a prize worth holding.

An enemy will naturally use similar planes for spotting over our own fleet and will protect them with fighting planes. In consequence, a reserve of fighting planes will be required by a fleet to destroy the spotting organization of the enemy. It is more than probable that in the initial stages of a fleet action all spotting and fighting planes will be flown. A vast air formation will appear on each side composed of spotting planes and fighting planes; the fighting planes endeavoring to win a decision and protect their spotting planes—the contending fleets meanwhile remaining out of gun range. Such a picture of the beginning of a fleet action naturally councils giving some gun armament to the spotting planes so they may protect themselves and even allow them to attack the spotting planes of the enemy and defend themselves from the fighting planes of the enemy.

Bombing planes and torpedo planes are difficult to carry to sea. They are large and cumbersome. However, our new aircraft carriers will have and fly planes of these types. These planes carry a gun armament for protection against fighting planes but are very vulnerable and easily shot down by agile flyers. Bombing and torpedo planes should be of fairly long radius for it will be necessary to fly them early in the action and they may have to keep the air until the action is over—or at least until they have dropped their bombs and torpedoes. They, too, must be accompanied by fighting planes. The commander-in-chief of a fleet will have to decide the moment when he will unleash his entire air force. His decision will be a momentous one. A premature release of this power would spell disaster, yet withholding it too long might give the enemy an opportunity to have a superior air force at the decisive moment in the fleet action.

Another picture which might be imagined is that of an air fleet analogous to one on the surface of the sea; the great bombing planes and torpedo planes representing capital ships; scouting planes and spotting planes being the light cruisers and fighting planes the swift, agile destroyers of the air; fighting planes on each side concentrating to bring a superior force upon the enemy air fleet at the crucial moment. The fighting planes first will receive the shock of action, the bombing and torpedo planes and the scouting planes holding aloof until they know the result of this battle. Eventually, there must come a mêlée in which all air units will engage. At the last, one side will be victorious and will have cleared the air of every enemy airplane. A draw in the air seems unlikely. There will be a complete victory for one side or the other. In consequence, each side must be prompt in flying and maneuvering its air forces to an altitude which will give an advantage in attack. After the air has been cleared of enemy planes, those remaining will carry on the missions of bombing, torpedoing, and spotting.

The side losing control of the air might well endeavor to retire, for now it has had thrust upon it a handicap almost impossible to overcome. The enemy battlefleet with spotting planes in the air can carry out its gun practice at ranges up to thirty thousand yards, the extreme elevation of the big guns. Bombing, gassing, and torpedoing of the enemy battle line will give the *coup de grace*. Even the remaining fighting planes may attack with

impunity, using light bombs, the destroyers and light cruisers, or they may seriously interfere by dropping light bombs on fire control parties and other exposed personnel units in the enemy's capital ships.

The stupendous consequence to a fleet of defeat in the air makes it so evident to the Navy that they must control their own air force and train the personnel of that force, that any idea looking to a unified organization which might not be entirely under the Navy's control is abhorrent and antagonistic to the Navy's doctrine of warfare on the sea. A unified or independent air force bringing with it the idea of cooperation only could not win the confidence of the Navy. The Navy emphatically demands absolute control over the weapons that may well be its deciding factor in battle.

When it is believed that the airplane has become such an important and vital factor to a fleet, the thought occurs that the importance of this weapon should give it greater prestige, even above that of the surface ships. There is no more reason for this view than to have said several years before the airplane was invented that, inasmuch as the gun and the torpedo were vital factors of success in battle, that therefore, the gunnery organization —the men who manned the guns and fought the guns or the destroyers that protected the battleships—should control the fleet. Many years ago the men who manned and fired the guns of fleets were not the men who sailed the ships. The men who sailed the ships decided when to open fire and by their knowledge of seamanship and maneuver placed the ships in advantageous position to give to the guns their greatest effectiveness. These sailormen, not gunners, were always the masters of the situation and responsible for the result of an action. Now, in the days of the airplane, the masters of the situation are those who sail and command the surface vessels, for these are the ultimate prizes for which the enemy fights.

It might well be contested that, inasmuch as advance forces—scouts and pickets—have in their keeping the safety of an advancing army or fleet in guarding them from surprise attack, this vital function should carry with it a greater prestige and even command over the destiny of all the forces. That this would be quite illogical is evident, yet when boiled down, such an idea is parallel to that heard from those into whose heads the intoxicating fumes of airplane capabilities and possibilities have mounted.

It has been stated that although the next war may begin in the air, it will end in the mud. This is most expressive. A fleet action will begin in the air but it will end on the surface of the sea and the gun and torpedo will come into their own. If the side losing control of the air is able to retire and escape, it will live to fight another day, for airplanes can be replaced in not a very great length of time. In fact, every sea power must have a large reserve of airplanes to replace casualties of service and supply the fleet after a battle, just as there are reserves of guns and ammunition to replace guns destroyed and ammunition used up.

It is evident there must be a controlling mind commanding all forces and responsible for every step in the action. Upon this man's shoulders must rest complete responsibility for defeat or victory. He probably will be in the battle line on a capital ship where his contacts will be as near perfect as can be made by radio or flag signal for communication with every unit of his command. He will pull the strings that release at the right moment all his nation's sea forces upon the enemy.

Airplane Administration: There have been offered several solutions for betterment of the air services. One that appears to have received some approval is the creation of a "Department of Defense" with three under-secretaries; one for the Army, one for the Navy, and one for the air. Such an organization requires a super-general staff composed of officers of each service to coordinate the activities of the three arms in addition to a general staff for each arm. Possibly there will exist the need of a fourth under-secretary to carry out the difficult duty of procurement of material needed by these separate and coordinate services.

In all wars, and no less in peace, there always has been some friction or passive resistance to efficient cooperation between the Army and the Navy. The basic reason for this is not far to find. The navy man and the army man, though bound together by the fundamental cords of strategy and tactics, interpret their problems into action upon two widely different elements, the land and sea, and besides the instruments and methods of transportation used by each are quite dissimilar. The past has found it quite impossible to find in one man a full knowledge of war operations in both elements. It is hardly likely that the future will have greater success, especially when we have added another element. In war, the controlling policy flows from the civilian head, but

unfortunately, he never has come versed in military or naval experience commensurate to make far reaching decisions for the cooperation of the two armed forces. He has depended upon counsel and it is this conflict of counsel that has caused in many cases the undoing of the civil authority and disaster to cooperation required in the combined use of the Army and Navy. How the creation of a department of defense will overcome these inherent human traits is hard to foresee. Organization is not the end—it is but the means to an end, and personalities are ever to be reckoned with. The under-secretaries each will have the same human factors to control, and placing the Army and Navy under a common civilian head will not alter the fundamental characteristics of the organization nor the instruments and the methods of transportation each will utilize to obtain a successful conclusion in war. There will remain the same opposite points of view as between the man who fights on land and the man who fights at sea, and we shall be no nearer obtaining a leader steeped in knowledge and experience of both arms. It seems evident, therefore, that the Army and Navy had best retain their traditional organizations and that combined operations continue to depend on coordination and cooperation.

It has been claimed by some that air power, be it over land or sea, is still air power. In other words, that the men who command aviation and fly over the land can do the same over the sea equally well. To those who doubt the feasibility of this, the answer is given—"it is so because the air is one." This claim and its reason for being true at first thought seem obvious, but upon analysis, doubts arise. True enough, the airplane, as long as it remains aloft, is in one medium and flying is everywhere flying, but the mission or objective has a vast influence upon the characteristics needed in those why fly. The qualifications of airmen may be said not to depend so much upon their air knowledge or upon their knowledge of flying as upon their knowledge of the medium to which they must come when the energy of their flying missile is spent. The aviator flying over land must understand meteorological conditions and know the available landing places en route. If he is flying for a military objective, he should be a trained army man in addition. If he flies over sea, he must understand navigation, be capable of reading weather signs and know where he can land in case of lack of fuel or the failure to keep his

machine aloft. If he should be on a naval mission, then his understanding of naval matters becomes an imperative qualification if he is to be useful. Therefore, the army aviator and the naval aviator are just as far apart in point of view, which is a product of training and environment, as are the army and the navy men who do not fly. There are times when the two viewpoints are not antagonistic, and then an amalgamation into one force is possible just as it is possible for naval and army ratings to work side by side in perfect accord when the objective is evident to each beyond a possibility of misunderstanding.

A Unified Air Force: Another solution of our air problem deals with a unified air force in addition to separate air arms for the Army and Navy, namely, a combined air reserve to be thrown in where most needed. Let us examine this solution. The Navy is our first line of defense and aviation is a primary weapon for that arm. Therefore the Navy's supply of aviation material must be limited only to the Navy's requirements and the capacity of the ships of the fleet. The Army requires aviation just as vitally as the Navy. It has become a sixth sense to that arm. After we have filled up these two services so that they are saturated with aviation, which should have the aviation units left over? Where, logically should these additional or reserve men and planes be put? The Navy could use them only after some of their planes have been lost or destroyed, for we have quite filled the Navy's needs and after battle casualties, it will not be possible as a rule to rush reinforcements of airplanes to the fleet. Should an action be fought near our coast, reinforcements might be sent but such is unlikely. Is it logical to take our reserve airplanes and put them under an authority independent of the Army and Navy? Is it not more logical that whatever air reserve we can afford should be under one or the other of the two great defense services, and as these airplanes will be held in reserve ashore, and not at sea, for by the conditions stated the Navy cannot find place for more planes, why should not this air reserve form part of the Army air arm?

There is an old saying that if one has something that is vitally needed by the public, the public will beat a track to your door. It is evident, however, that in this saying the element of time has not been considered and this has given to us the method of advertisement which lessens the time required to beat the track. The airplane has come in for a great amount of advertisement. The advan-

tage of this is that the public realizes the great potency of the airplane and the vital need of a proper air force for war purposes, but as the public clears away the underbrush to reach the need, which has been shown to be a vital one, it is well for it to pause and analyze this new weapon and its place in our national defense.

Victory by Moral Effect: It is sufficiently evident to the military or naval mind that what has been termed "Victory by moral effect" is absurd. Even against savage tribes, the bombing of their villages has merely stiffened their resistance. The records of thirty centuries should convince mankind that victory in war can be gained only by fighting for and winning possession of the sinews of war, which are located on land or on the sea, and not yet in the air.

In the World War, at Verdun, although great quantities of explosive shells literally demolished the surface of the earth, yet the French infantry remained amid this destruction and were able to repel the attacks of the German infantry immediately after tremendous artillery bombardments. This will occur again. All the bombs in the world cannot drive determined men out of occupied positions. It may be necessary to dig deeper and deeper bomb-proofs, but in the end, it will require men on foot with rifles and bayonets to win and hold territory.

The sinews of war are the resources on land and sea which enable a nation to prosecute a war. These are the object of attack, and can be attacked by land, by sea, and by air. The air gives a nation a new method of attack, but the objects of attack are the same.

The Navy has long since taken the airplane seriously and no longer looks upon it as an experimental toy to be used by young and daring men for mere "joy-riding." The airplane has become a major weapon of war and must form a large part in the armament of every warship, naval auxiliary, and naval base. Naval men, each and all, will, at a not far distant time, fully understand this new weapon and be capable of riding it. No naval man can hold a fear of it nor be willing to shift the control to a group of men who may be anxious to accept for a compensation the extra hazard of operation. The Navy knows that to win battles on the surface of the sea, the air above the fleet must be controlled, and the direct instruments for that purpose, airplanes, must be thoroughly mastered by all. The Navy for its own good dare not continue to have a *corps d'elite* of airmen, especially when such a corps will hold the key to victory in battle.

A DESTROYER LEADER FOR THE UNITED STATES FLEET

By Captain J. K. Taussig, U. S. Navy

Foreword

WITH the spirit of economy sweeping the nation, it would seem fitting before advocating the construction of a new type of man-of-war for our Navy, to make a brief analysis of the situation to ascertain whether or not the efficiency of the fleet makes such a class of ship desirable or necessary.

The writer is convinced that the Limitation of Armament Treaty reduced the value of the modern light cruiser. He believes that the building of more of this type of ship is the greatest need of our Navy today. He is also convinced that our fleet will never be well balanced until there are provided a number of ships which, in foreign navies, are known as destroyer leaders, or flotilla leaders. However it is wished to emphasize that nothing in the arguments advanced for the construction of such ships should be construed as implying that destroyer leaders should be given preference over additional light cruisers.

Command with Relation to Our Destroyer Force

Through the exigencies of the Great War, the United States Navy finds itself with a destroyer force considerably in excess, as to numbers of vessels, to that of any other nation. Should there be another war during the efficient lifetime of these destroyers, they should prove an important asset in the conduct of any campaign.

But we must not repose too comfortably in that common fallacy which assumes that mere numbers of ships determine the relative fighting strength between two opposing forces. Fighting strength of any combatant naval force is determined by two principal factors, viz., personnel efficiency and material efficiency. The material efficiency is a combination of, or the product of, the ability to inflict damage and the ability to resist damage as exemplified in the design and structure of the ships.

Personnel efficiency is made up of a large number of elements. Briefly, the chief of these are: the elemental knowledge of all individuals—officers and men—in the professional subjects of gunnery, engineering, seamanship, and communications; the higher professional knowledge of all officers in navigation, tactics, and strategy; the knowledge of the still higher ranking officers in all the above, with additional knowledge of policy, international law, national strategy, and the "principles of command," together with the ability to apply these principles effectively.

The most important of all these qualifications is that relating to command. It is the commander of any ship, group, force, or fleet, on whom devolves the onus of making use of the knowledge and ability of all his subordinates to the best advantage. It is such commander, who, at all times, but especially during war, must bear the responsibility of materially coordinating his forces that they will be able best to cooperate for the attainment of the common end. It is such commander who by force of example and who by his knowledge of human nature must insure a high state of morale throughout his command. The combination of all these elements, factors, principles (or whatever one might wish to call them) is made effective through command.

In order that command may be effectively exercised at sea, certain fundamentals have been proved by experience to be essential.

First: The commander of any ship or group of ships must have the living quarters and living conditions suitable for the dignity of his office and the comfort of his person. Not to be so situated (undoubtedly owing to the frailty of human nature) detracts from the ability of one with grave responsibilities to exercise his best efforts. This is not a new theory or principle. It has been recognized from the earliest seagoing days, and has been practiced since ships became large enough to make it possible.

Second: The commander of any ship or group of ships must have officers assigned as aids to assist him in the exercise of his command. On board individual ships this is generally recognized in the form of an executive officer and the heads of departments. In groups of ships the commander or flag officer has certain officers, independent of individual ship duty, who are generally known as the staff. This is common practice in all navies.

Third: The commander of any ship or group of ships must have the material equipment and facilities for the proper exercise of the functions of command. These facilities and the equipment necessary have become more and more complicated and bulky with the ever increasing complexities of modern warfare. They vary somewhat in size and extent with the size and number of units that are to be directed. Efficient command cannot be exercized without these facilities and equipment.

That efficient command requires all of the three foregoing is generally recognized in all the navies of the world. That we, ourselves, recognize them is demonstrated by our fleet organization. We have been moving broadly forward in this direction by giving the commander-in-chief of the United States fleet an independent flagship, separated from all tactical units of the fleet: one in which he has plenty of room for himself, his staff, his offices, together with the necessary equipment and facilities to enable him to exercise command with as much freedom from minor and unimportant details as practicable. For the command of units as small as three battleships, or four cruisers, we assign a flag officer and provide him with a personal staff of officers. On the unit designated as flagship suitable living quarters are provided, and suitable equipment is installed and facilities of command.

How About the Destroyers?

When we examine the command situation with respect to our destroyers a different situation is found. In pointing out that we are not so far along in the art or science of commanding vessels of this type as we are with other vessels, the statement is not made in the spirit of criticizing any of our former or present destroyer force or flotilla commanders. Those who are familiar with the development of the destroyer, together with the organization of the destroyer forces, can readily see that steady advancement has been made in all fields of destroyer activities. It is not so very long ago when an officer with the rank of lieutenant commander, in command of a single destroyer, was, in addition, saddled with the responsibility of tactical command of a division of six destroyers. And this without the assistance of any officers other than those belonging to the regular ship's complement. At times this command went beyond the tactics, and entered the fields of strategy and administration of all matters connected with the

division. At times this commander of a single ship had to command even more than one division.

This situation has been gradually improved until we recently completed the evolution of having commanders of all active destroyer divisions relieved of individual ship command. We have also reached a situation where each active squadron has a commander independent of all division and ship command. This, of course, is as it should be. It is the common practice for commanders to command divisions, and for captains to command squadrons. Are these the ranks which should be assigned to these duties?

Comparison Between One Light Cruiser and Six Destroyers

It is generally conceded by experienced officers that a captain should command a light cruiser. This is the practice in our Navy and in the leading navies of the world. Let us compare one such cruiser with a division of six destroyers.

	Displacement	Horse Power	Battery	Officers	Enlisted Men
1 Light Cruiser	7,500	95,000	12 6-inch 4 3-inch 10 torpedoes.	30	429
6 Destroyers	7,200	165,000	24 4-inch 6 3-inch 72 torpedoes.	48	684

Without going into a wordy analysis it is evident that, in so far as personnel and material are concerned, the six destroyers are considerably more of a command than is a single light cruiser.

If we look into the questions of tactics and strategy, a comparison is enlightening. Our light cruisers are now organized in divisions of four ships each, with a rear admiral in command of each division. It is seldom, if ever, that the captain of a light cruiser will have to exercise either tactical or strategical command over units other than his own individual ship. It is seldom, if ever, that he will be called on to exercise administrative command over units other than his own ship.

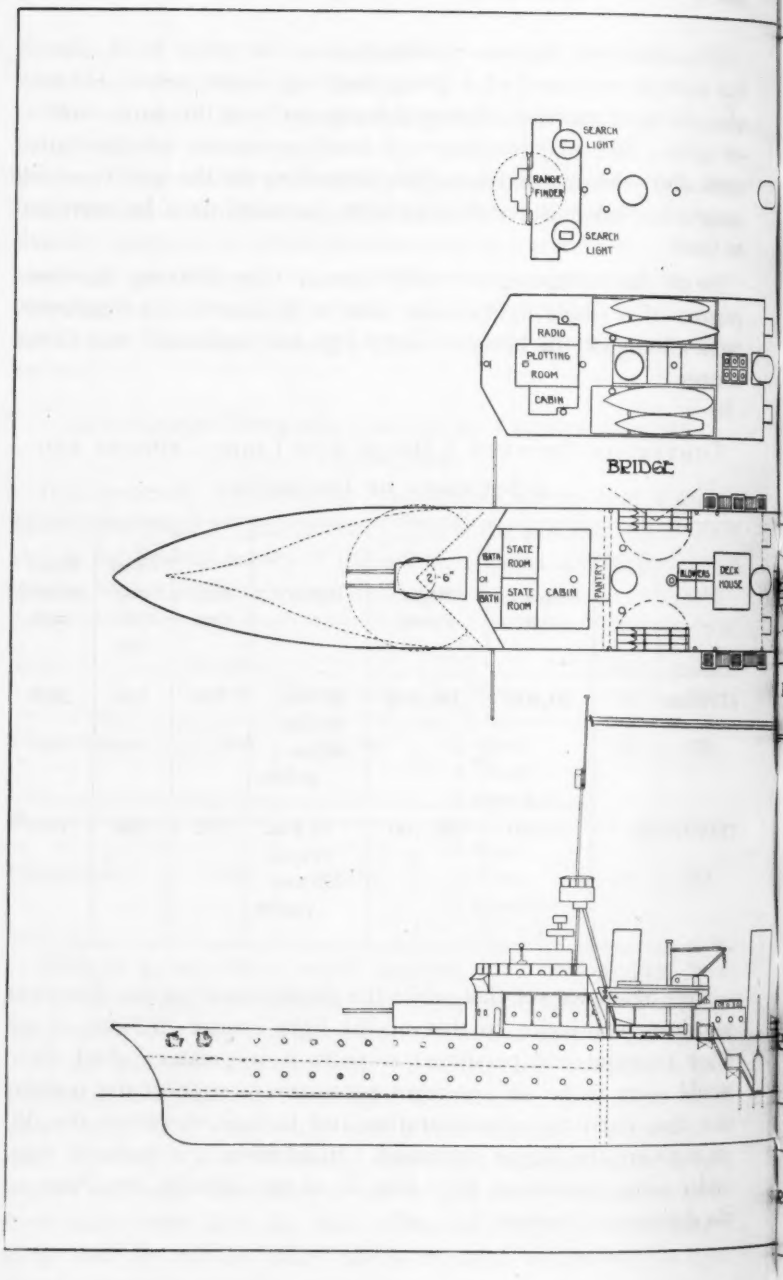
The destroyer division commander, on the other hand, always has tactical command of a group made up of six units. He may often have to exercise strategical command over this same number of units. He may or may not have permanent administrative command over his division (this depending on the unit to which assigned): but it is certain that such command must be exercised at times.

From the foregoing it would appear that, viewing the comparison of a single light cruiser with a division of six destroyers from all angles, the latter is really a greater command than is the former.

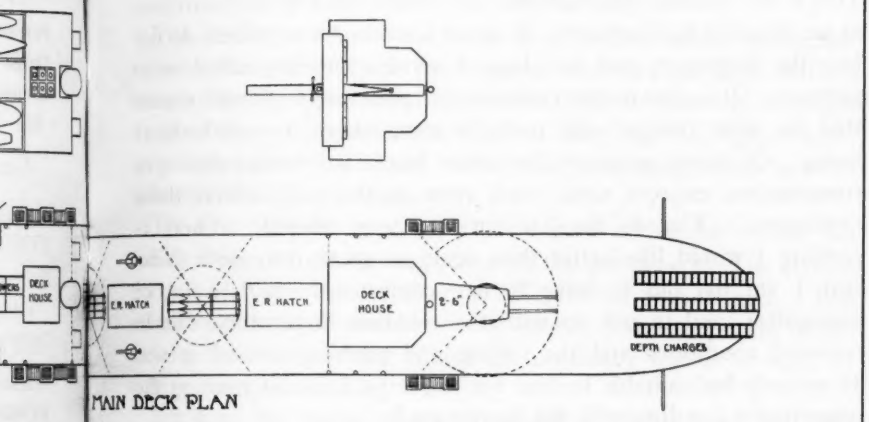
COMPARISON BETWEEN A DIVISION OF LIGHT CRUISERS AND A SQUADRON OF DESTROYERS

	Displacement	Horse Power	Battery	Officers	Chief Petty Officers	Other enlisted men
4 Cruisers	30,000	380,000	48 6-in. 16 3-in. 40 torpedoes	120	116	1600
19 Destroyers.	22,800	522,500	76 4-in. 19 3-in. 228 torpedoes	152	190	1976

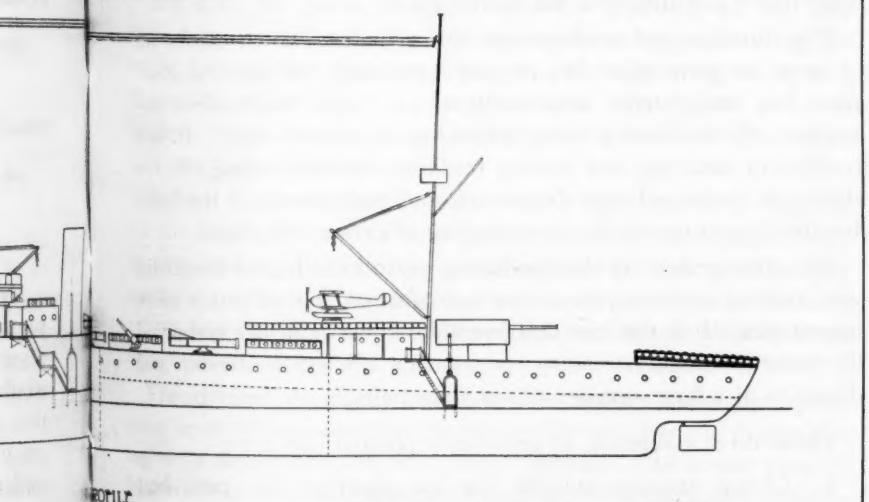
Here again we see that while the displacement of the destroyer squadron is inferior to that of the light cruiser division, in all other material and personnel respects it is greater. And there would seem to be no argument necessary to support the contention that from the administrative and tactical viewpoint the destroyers are the bigger command. In addition it is probable that, under some conditions, they may be as strategically important as the division of cruisers.


SEARCH LIGHT
RANGE FINDER
SEARCH LIGHT
RADIO
PLOTTING ROOM
CABIN
BRIDGE
BATH
STATE ROOM
CABIN
BATH
STATE ROOM
PANTRY
BLOWERS
DECK HOUSE
2'-6"
E.R. HATCH
MAIN DECK PLA
AROMILE

APPROXIMATE DIMENSIONS		BATTERY
DISPLACEMENT	3000 TONS	4 TRIPLE 21" TORPEDO TUBES
LENGTH ON W.L.	400 FEET	4 6" 53 CALIBER GUNS.
BEAM	40 FEET	2 ANTI-AIRCRAFT GUNS
DRAFT MAXIMUM	16 FEET	3 DEPTH CHARGE RACKS
H.P. (SHAFT)	70,000	2 Y-GUNS
SPEED	36 KNOTS	



MAIN DECK PLAN



ROFILE

PROPOSED PLAN OF DESTROYER LEADER

Why the Discrimination Against Destroyers?

In view of the foregoing comparison it may well be asked why the destroyers are so palpably discriminated against in this most important question of command.

Few of the older officers who had continuous destroyer duty during the Great War have desired to return to such duty; or, if they have desired to return, they have refrained from so doing. This is not because these officers do not have faith in the destroyers as an effective fighting arm. It is not because these officers do not love the destroyers and the class of service they are called on to perform. It is due to the fundamental principle in human nature that the older one gets the more he cares about the comforts of living. On many occasions the writer has heard former destroyer commanders express some such view as this: "Look at those destroyers! That is the life for a young officer! There is nothing I would like better than again to go to duty with them. But I am too old to have to live continuously with a lot of youngsters, and to put up with the constant discomforts due to crowded conditions and the rolling and pitching around at sea. If we only had suitable leaders for flagships, I would jump at the opportunity for duty with the destroyers."

This fundamental weakness of human nature which causes all of us as we grow older to care more and more for physical comforts has undoubtedly kept many of the more experienced destroyer officers from seeking additional destroyer duty. It has resulted in what has now become tradition that only young officers should be connected with destroyers, and undoubtedly is the basis for the Department policy in assigning officers to this duty.

The other reason for discriminating against the higher command with respect to destroyers is also fundamental, and of much more importance. It is the fact that in no destroyer built are embodied the three essentials necessary for securing efficient leadership and direction of a large number of seagoing units.

These three essentials, as previously pointed out, are:

1. Living quarters suitable for an officer of the rank best qualified to command a squadron of destroyers.
2. Living quarters suitable and sufficient for the personal staff of the squadron commander.

3. Sufficient space and displacement for the essential facilities and equipment required for the exercise of efficient command of so large a number of units.

The foregoing reasons are stated as the result of both personal experience and study, and from information garnered in conversations with many officers of wide destroyer experience.

Light Cruisers as Destroyer Leaders

The destroyer squadrons, battle fleet and the destroyer squadrons, scouting fleet each have one of our newest light cruisers assigned as flagship. There is agitation in some quarters to assign more of these vessels to this class of duty. Is the light cruiser an efficient destroyer leader and should such assignment be considered one of its functions?

The first thing to be noted in this regard is that the cruiser has sufficient speed to keep company with the destroyers. The second thing is that the light cruiser is of sufficient size to give a flag officer and his staff suitable living quarters, and to permit of installing the facilities and equipment necessary for the control of a large number of units.

But here the points in its favor end. The rôle of the light cruiser is one of commerce destroying, scouting, defending the battle line against destroyer attack, and supporting destroyers in making an attack. Its primary weapon is the gun. It is too large to maneuver in formation with the destroyers. Therefore it is not a good leader.

It may be considered by some that a light cruiser is suitable for the flagship of two or more squadrons of destroyers, each with its own leader. But in order to utilize them for this purpose they must be removed from their legitimate and contemplated field of action, and thereby considerably weaken our already pitiably weak information force.

The efficient destroyer leader besides having space and speed, must be of dimensions and characteristics suitable for maneuvering with destroyers. In its proper offensive rôle it will have to lead torpedo attacks against capital ships. Therefore its primary weapon should be the torpedo instead of the gun.

The light cruiser does not fulfill these qualifications. There are no ships in the United States Navy that do fulfill these

requirements. Vessels of such qualifications and capacity are essential for the efficient operations of destroyers. Therefore there is only one answer, viz.: The efficiency of the United States fleet requires a new (to us) type of vessel in order that our large and powerfud destroyer force can fully exercise the great kinetic energy which it potentially contains. Such is not the case at present.

While a type of vessel called a *destroyer leader* would be new to our Navy, such is not the case with a number of foreign navies. Most of the leading powers have long recognized that the maximum efficiency from large numbers of destroyers can only be obtained by having suitable leaders. Many officers of our Navy have likewise recognized this fact. Some years ago, when our destroyer force began to reach a respectable size, the opinion was frequently expressed by officers connected therewith that a special type of vessel was needed for proper leadership. High ranking officers have frequently expressed this opinion. The general board has consistently recommended their construction. Only recently we have the recommendation from three high sources, viz.: the special board ordered by the Secretary of the Navy to investigate the relationship between aircraft and surface craft; the general board; and the commander-in-chief of the United States fleet—that destroyer leaders immediately be provided for.

As yet the necessity for this type of vessels has not impressed itself upon Congress. Now that for a few years no funds can be expended on capital ship construction, let us hope that the opportunity for increasing the efficiency of the fleet by bringing our auxiliary fighting ships up-to-date, will result in the coming Congress authorizing the construction of destroyer leaders.

Foreign Leaders

If we are to have a new type of vessel, one which, at the same time, is not new to other navies, one of the essentials is that our ships should be at least as powerful in all respects as those already built or contemplated by these foreign navies. For reference the following table is inserted giving data of the three leading European navies.

DATA CONCERNING FOREIGN DESTROYER LEADERS

Nation	Number built and authorized	Characteristics of latest type built or projected					
		Displacement	Maximum Speed	Battery			
				Guns		Torpedoes	
				Number	Caliber	Number	Size
Great Britain	18	1750	36	5 1 7	4.7 in. 3" A.A. 2 pds & machine guns	2 triple	21"
France	11	2500	36	5	5.1 in. 2.9" A.A.	2 triple on center line	22"
Italy	11	2200	35.5	8	4.7 in. (twin) mounts 3" A.A.	2 triple on center line	21"

In Japan we find no ships carried on the navy list in this classification. But the trend of Japanese affairs with respect to destroyers is interesting. We find them recently launched on a building program of twenty destroyers, each of 1,500 tons displacement. These destroyers, it is to be noted, are larger than ours, and are as large as some foreign vessels which are classed as leaders. It has been reported that Japan is about to start a program of several 3,000-ton leaders. However, this has not as yet been verified.

But while Japan has no destroyer leaders in name, she has such vessels in fact. Japan has three vessels classed as "small light cruisers" which are performing the duties of destroyer leaders. These are the *Tenryu, Tatsuta,* and *Yubari.* They have recently replaced the older *Chikuma, Hirato,* and *Yahagi.* So necessary does Japan consider special flagships for their destroyer squadrons at all times, that it is the practice of the Admiralty to assign the larger 5,500 ton cruisers to this duty, when, for any reason, the regular vessels must be temporarily withdrawn.

As the Japanese light armored cruisers are destroyer leaders in everything but name, their characteristics are of interest and therefore the following table is inserted.

JAPANESE LIGHT ARMORED CRUISERS ACTING AS DESTROYER LEADERS

Name of Ship	Displacement	Maximum speed	Guns	Torpedoes
Tenryu } *Tatsuta* }	3,500	31	4 5.5" 1 3" A.A.	3 twin 21 inch
Yubari	3,100	33	6 5.5"	4 twin 21 inch

The post war *Yubari* with its greater speed and greater gun torpedo power, comes nearer to being a real destroyer leader than do the other two which were provided for in the 1916 program. Therefore it is the *Yubari* which should be used for purposes of comparison with any destroyer leader that we might build.

If we take as a basis the best characteristics of all destroyer leaders so far built or known to be projected, our vessel should have qualities *not* less than the following:

Speed, 36 knots; battery, gun power of six 5.5-inch guns or eight 4.7-inch guns, torpedo power of six 22-inch torpedoes.

We must not, however, be satisfied with these minimum requirements, but should endeavor to make the forthcoming product as powerful and speedy a vessel as commensurate with the restriction that it have approximately the same maneuvering capabilities as our present destroyers.

SIZE OF THE VESSEL

While the size of the vessel depends largely on the desired speed, steaming radius, battery, both guns and torpedoes, and habitability for both officers and men, the exact displacement and dimensions can be arranged for in two ways. One is arbitrarily to fix the maximum and then compromise on the various factors in order to get them within this fixed space. The other is to determine the factors first and then make the displacement and dimensions suit all of these factors. The latter seems the better, provided the

finished product does not exceed the size suitable for this type of vessel. This latter method has been followed. A rough estimate for determining necessary weights and their distribution shows that a destroyer leader embodying the desired military characteristics should displace approximately 3,000 tons. Built on similar lines to our destroyers and light cruisers the approximate dimensions would be: length between perpendiculars, 400 feet; extreme beam, 40 feet, and maximum draft, 16 feet.

Speed

Our destroyer leader must accompany destroyers which have a maximum speed of 35 knots. It may encounter enemy destroyer leaders which have a speed of 36 knots. Therefore our plans must provide for a speed of not less than 36 knots, and as much additional as may be obtained without compromising other essential features.

To drive such a vessel at 36 knots would require a shaft horse power of 70,000. It is desirable for simplicity in uptake construction and with a view to having the least practicable number of smokestacks, to have as few boilers as possible. If we had only four boilers, each would require 13,000 square feet of heating surface. As yet no boiler as large as this has been designed for any vessels of our Navy. The largest boilers are those of the airplane carriers which have a heating surface of 10,500 square feet each. Considering all factors, including the embarrassment that might be caused by the disablement of any one unit, it is considered that the boiler plant had best consist of six boilers, each of about 9,000 square feet heating surface, and so arranged as to give maximum efficiency compatible with structural integrity. This may result in the boilers being placed four in one fire room and two in another; or it may be better to arrange them in three fire rooms of two each.

Cruising Radius

The cruising radius of any ship that is expected to accompany destroyers on practically all occasions must be at least equal to that of our best destroyers, at both economical and maximum speeds. This attainment is a question of engine design and fuel capacity. No effort will here be made to determine whether steam driven turbine or electro turbine machinery is the more suitable

for this class of vessel. That is left to our designing engineers. Nor will attempt be made to figure the amount of fuel that must be carried. If, after consideration is given to all other essential military features it is found that sufficient fuel cannot be carried on a displacement of 3,000 tons, it will be necessary either to increase the displacement or sacrifice elsewhere. It is believed that the general efficiencey of the vessel would be better served by increasing the displacement.

Battery

Torpedoes. Our 1,200-ton destroyers carry twelve torpedoes in four triple tubes all placed outboard thereby giving a broadside fire of six torpedoes. The practice in most foreign navies is to install torpedo tubes on the midship line. That we have not heretofore adopted this same method has been due, in part, to the fear that the after bodies of our torpedoes are not of sufficient strength to withstand the impulse force sufficient for insuring the torpedo clearing the side. This can no longer be a legitimate reason for not installing tubes on the midship line as we have now designed torpedoes that will withstand 150 pounds pressure on their after bodies. This is sufficient to insure their clearing the side if fired from the midship line of such a vessel as a destroyer leader. It is recognized, of course, that the arc of train of the tubes will be somewhat reduced by such an installation, but this is not sufficient reason for discarding it.

One disadvantage of the midship method of installation is the greater amount of deck space that must be kept clear both for the train of the tube and the clearance of the torpedoes after they have left the tube. However there are many advantages, similar to those which forced us to place our main battery guns on the midship line.

Taking all factors into consideration it is believed that best assurance of a formidable broadside torpedo fire can be obtained neither by having all the tubes mounted outboard nor by having all mounted on the midship line. A compromise is best in order most effectively to meet all situations. The sketch plan submitted herewith shows such an arrangement. Two triple tubes are on the midship line, and two are mounted outboard. This gives a broadside of nine torpedoes, with a ready reserve of three. There would appear to be no good reason for not carrying spare tor-

pedoes on board. This is a factor which is denied our destroyers owing to lack of sufficient space.

Guns. Most of our destroyers have main battery guns of 4-inch caliber. Some few have 5-inch. What caliber of gun and how many should our leader have?

The smallest caliber gun carried in the main batteries of the foreign leaders is the 4.7-inch. The largest caliber is the 5.5-inch of the Japanest *Yubari.* That vessel carries six of this size. It would seem, then, if we are not to have an inferior ship, the main battery of our leader should equal or exceed in power the six 5.5-inch guns of the *Yubari.*

We have not designed guns between the 5-inch and the 6-inch, and there would not now seem to be any good reason for designing such a gun. Our choice, therefore, lies between the 5-inch gun and the 6-inch gun. We have successfully employed 5-inch 51-caliber guns in twin mounts, and we have successfully employed 6-inch 53-caliber guns in single mounts and in turrets. The following table shows a comparison between the weight factors involved in a twin 5-inch and a single 6-inch.

	Guns and mount weight	100 rounds: weight of projectiles	100 rounds: Total weight of projectile, powder, and tank
Two 5″/51 caliber twin mount	39,720 pounds	10,000 pounds	19,400 pounds
One 6″/53 caliber with mount	35,684 pounds	10,500 pounds	18,200 pounds

It is seen from these figures that two 5-inch guns in twin mounts will deliver one pound of projectile only about 85 per cent as economically as a single 6-inch gun.

While it does not seem practicable accurately to evaluate 5-inch and 6-inch hits on a target it would seem that against totally unarmored ships two 5-inch hits scattered might be better than a single 6-inch hit. On the other hand, two 5-inch hits close together, probably would not do as much damage as a single 6-inch hit. It is certain that if the target ship has any armor protection, the single 6-inch hit will be much more effective than two 5-inch. In this

connection it must be borne in mind that many light cruisers will have some armor protection.

It is not the intention that destroyer leaders should seek engagement with light cruisers. However there is no doubt but in the carrying out of their legitimate functions in a fleet engagement, they would encounter such vessels. They will, of necessity, fire on cruisers encountered. Therefore they should have a gun which throws a projectile of sufficient weight to do hurtful damage to light cruisers. It is also probable that newly constructed submarines will carry guns of at least 6-inch caliber. Our destroyer leaders should be able to stand up to such ships in a gun duel.

A decided disadvantage of a twin 5-inch over a single 6-inch is that the former takes practically twice as many men to operate and serve. This is an important factor in any vessel, and particularly in a small one.

We are now successfully operating 6-inch guns in turrets on our light cruisers. There is, of course, some additional weight due to the material used in the turret construction over that of two 6-inch guns singly mounted. But the military advantages of such installations far outweigh the disadvantages of the extra weight. It would seem, therefore, that if 6-inch guns are used, they should be in turret mounts.

Four 6-inch guns in two turrets will take up less deck space along the center line than will four twin 5-inch similarly installed. Some space for the 5-inch guns can be saved by construction which enables one pair to shoot over another. This is the practice in most foreign navies. It has been demonstrated, however, that this arrangement, forward, greatly interferes with ship control, as the upper pair of guns must of necessity be close to, and about the same height above the deck as is the bridge. Ship control, especially in relation to the control of the entire squadron, is to be one of the most important functions of the leader. We should not do anything to jeopardize it.

It is possible that in a seaway the 5-inch guns will be easier to serve than the 6-inch guns. But as for accuracy of shooting it would seem that the 6-inch gun has the advantage. This is because of the better ballistic qualities which insure less dispersion, and because of the protection from the wind and spray the turret mount affords the gun crews.

Considering all the factors as here discussed, the conclusion seems inevitable that the best main gun battery for our destroyer leaders will be four 6-inch 53-caliber guns mounted in pairs in two turrets on the midship line, one forward of the bridge, and one abaft of the main mast.

Anti-aircraft guns and depth charges. No modern vessel is up-to-date without protection against aircraft. It is impracticable, of course, to give such a vessel as a destroyer leader that structural strength sufficient to withstand the damaging effects of bombs. It is practicable, however, to give some measure of protection with anti-aircraft guns. Accordingly our leader should be fitted with not less than two such guns of the largest caliber her characteristics will permit.

No small fighting ship is complete without means of offense against submerged submarines. Therefore our leader must be equipped so as to be able to drop depth charges from racks and throw them from Y-guns. The limit of depth charges should be fixed as the maximum number that can be carried without interfering with the other military characteristics of the ship.

Aircraft

Every modern combatant ship with sufficient capacity should carry at least one airplane. It is not intended here to give the arguments for justifying this assertion. It is desired to point out, however, that there is an excellent reason, in addition to those usually advanced, for having our destroyer leader fitted to carry aircraft.

The chief function of a destroyer leader is to furnish efficient means for the command of destroyers in action. Destroyers in action will, whenever practicable, attempt to get within striking distance of their targets under cover of smoke screens. This generally requires at least one destroyer to be uncovered and exposed to enemy's sight. However, under certain conditions it is possible for an entire squadron to bear down on an enemy from behind smoke without a single ship being exposed after getting within the enemy's gun range. But under these conditions there is no efficient means of regulating the torpedo fire. With each leader fitted with a plane, it will be practicable for such plane to remain over the attacking destroyers and above the smoke, and give the squadron commander the information necessary that

will permit of effective fire without a single ship being exposed to the enemy gun fire.

The plane carried on a leader should be a seaplane, and be capable of being catapulted. If the catapult were placed forward of the bridge, the plane while on board would be subject to spray and might interfere with the ship control. A better place for the installation of the catapult is just forward of the main mast, from which place the plane could be catapulted on either side.

The dimensions of the plane and catapult shown in the sketch are the same as the *VO* 2-seaters now carried on the light cruisers.

Command Equipment

While attempts have been made to convert some of our destroyers into leaders, all reports indicate that they are not efficient as such. As previously pointed out, it is impracticable to secure sufficient living space, and to place the necessary equipment on so small a vessel as a destroyer.

Efficiently to lead or direct a squadron of destroyers, the commanding officer must have the following which cannot be had on destroyers:

1) Adequate radio equipment.
2) Adequate visual signalling equipment.
3) A range finder with a base not less than twenty feet.
4) A suitable plotting room.
5) Sufficient living quarters for himself and staff.

The sketch design submitted herewith shows that these essentials, together with other necessary military characteristics, can be provided for on a vessel of approximately 3,000 tons displacement. A smaller ship would have military weaknesses that would make it not worth while for the purpose intended.

Conclusion

It is not held that the sketch design submitted herewith depicts the *best* destroyer leader that can be built. It is simply a basis on which our engineers and constructors might begin should it be decided to design and build a leader with characteristics similar to those to which the arguments set forth in this paper seem to point as desirable. It is realized that when the designers compute weights, horse-power, etc., and when they go more minutely into details of arrangements, flaws may develop in the general outlay as here presented.

PRESERVING TRADITION

By Colonel Henry C. Davis, U. S. Marine Corps

WEARING the black neckerchief by enlisted men of the naval service has caused many persons to ask the question, "Why do they wear that silk handkerchief around their necks?" And frequently the answer is, "Because it is a part of the uniform." But why is it a part of the uniform? Out steps Old Man Tradition and says, "It was originally a badge of mourning for Lord Nelson adopted by the British Navy."

I suppose it came to be a part of our uniform because many of our men at the time of the death of Nelson were more British than they are now and the matter of naval uniform was largely taken from the existing British naval uniforms of that day. Whether or not it is a fitting part of our uniform is not the question here, but it is a fitting part of the British uniform and means something to the British seaman, because he knows it still marks a memorable naval hero of the British Empire.

Once an American was being shown the sights of Madrid by a very courteous Spaniard and, as he pointed out to him various marvelous wood carvings, he stated that such and such a piece took several years to make. Each time the American replied to the effect that in America there was an equally fine piece which only took about one-fourth of the time to make which the Spaniard had said was required for the things he pointed out. The native politeness of the Castilian prevented any comment, but as they approached the very large building in which several regiments of the Spanish Army were quartered, an enormous building, the American asked, "What is that building?" The Castilian, pretty well fed up with reports of American speed, bowed, and replied, "I do not know, Señor, it *was not there last night.*"

Now tradition may not be here today and it may never be here if we make no effort to pick, from the mass of historical happenings, those things which are worthy of preservation as *tradition*, and begin from that minute to make them material things around which to build the morale of the service.

I am told that some British regiments still wear on the back of their tunics a piece of cloth, the original purpose of which was to prevent the uniform being soiled by the greased queue of the soldier in the days when soldiers wore their hair long enough to hang down their backs. We material Americans will say, "Silly." But is it silly to preserve any tradition? I do not think so; and with the better understanding of the value of tradition which the British seem to possess, these little things are maintained and by them is increased the very valuable *esprit de corps* which we all desire so much but do so little to foster.

Take an example in the other direction. One of the two Marine regiments which made such a gallant record in the fighting in and around Belleau Wood has been disbanded.[1] The colors of this regiment were decorated with the Croix de Guerre, the individuals of the regiment are authorized to wear the *fourragère* while attached to the regiment, but with the disbanding of the regiment there are none to wear the decorations, the regimental colors are cased, and the traditions of the regiment are allowed to die for no reason that is apparent.

I say for no reason. Of course, the reason the regiment is disbanded is because of the shortage of men, but it could be kept alive by giving the number six or five, as the case may be, to that other regiment which is organized in another part of the country. Under no circumstances would I allow the record of the imperishable Fifth and Sixth regiments to discontinue. Let other regiments be broken up when necessary, but always there should be somewhere in the Marine Corps a fifth and a sixth regiment. Always their colors should be with them and be used and displayed and made a shrine at which new men in the Corps could learn of the records of those gone before. By such means is tradition builded, and tradition is the mother and father of *esprit de corps*.

I suppose it would be entirely too radical to change the system of naming our capital ships from the names of states to the names of those great ancestors of ours who fought and made the United States possible. But it does seem to me that to preserve for the naval service the names and traditions of those gentlemen who commanded our line-of-battle ships and frigates, as well as the

[1] I am informed this regiment either has been or is being "stabilized." When this was written it had been disbanded.

sloops and the brigs and ketches, a better means is available than attaching their names and a number to our destroyers.

It is more impressive to me to think of the super dreadnoughts as the *Lawrence* or the *John Paul Jones* or the *Macdonough* or the *Barney* than it is to think of them as they are named. With the immortal records of these men closely associated with the ships of the present day, is it not possible that some of their immortal spirit would be more largely present in the Navy than at present? Who could enter battle on a ship named the *John Paul Jones* without remembering the famous, "I have not yet begun to fight" flung into the teeth of the enemy from the sinking decks of the *Bon Homme Richard?*

All of us are familiar with the story of the Englishman who saw the old *Ohio* for the first time on the Asiatic station and who made an inquiry as to why a battleship should be named the *O-H ten,* the *O-H* part of the name being on one side of the quarter and the *I-O* on the other. Now the naming of a battleship should be a matter to inspire tradition and raise morale and *esprit de corps,* and while we admire and honor the great commonwealths after which they are named, the names themselves do not inspire in us any great thought of the traditions of the naval service, such as must be alive in the minds of our English friends when they tread the deck of the *Nelson,* the *Rodney,* or the *Hood.*

There appears to be too much of the spirit in the United States displayed in a recent number of a weekly paper. A contractor in talking to the boss of the construction job on a building says to him, "Hurry up and finish this job so we can tear it down and put up a bigger building." This is progress, but is not such progress made at a sacrifice of something finer and better which we all need in fostering such spiritual sides of our nature as we have been provided with?

Can any one imagine in this country a building left in a state of incomplete construction so that at some far distant date our great grandchildren and their great grandchildren could see woven into the very fabric of the building the tradition of ages through which it had passed and so that its venerable walls would become a very part of the nation's life? I do not believe so. If such an edifice was not constructed rapidly, the incompleted walls would be bought up and something modern and rapidly constructed put in its place.

But the naval service has at its disposal tradition and history galore on which to base its building of *esprit de corps* and morale if only the naval service will interest itself in this most essential factor in such an organization.

Hundreds of heroic acts by enlisted men of the naval service could be preserved and made a live thing in the formation of naval character if they were read to recruits at all training stations at frequent periods of their training. Any drill period could be well spent in reading to the recruits some of these records from the files of the Navy Department. Some of these boys would be inspired by this sort of training and certainly there would spring into being a very real sense of the reality of the individual whose acts were held out as examples for all the naval personnel to follow.

The commissioned personnel in training at the Naval Academy should have a definite period in which an interesting article, on the heroic acts of some of those gone on before, might be read and expanded before them so that a familiarity with our own heroes would be established on a basis which would result in emulation of those naval heroes of the past.

Let us take the matter of uniform and its bearing on morale and what effect tradition has on it. Why have we preserved through all the vicissitudes of change in naval uniform, the black neckerchief of the enlisted men? I don't know, but we do and it is so distinctly a part of a seaman's uniform that it would be a loss to take it out of the uniform requirements. Let its origin be what it may, its preservation for more than a hundred years is the essential thing and the fact of its preservation is an act in the right direction to the preservation of tradition.

There is a story of a British regiment which for more than a hundred years had worn a white collar with its uniform. When a move was initiated to take from them the white collar and make them like other British regiments in that respect, the effort almost started a mutiny both among officers and enlisted personnel. The white collar was left to them and I believe is now a part of their uniform as it has been for more than a hundred years.

So tradition may be preserved by the very clothes a man wears. Who could ever mistake a naval officer in his chapeau? It is a distinctive head gear, it is reminiscent of heroic days in the Navy and it should remain always a part of the naval uniform.

The blue uniform of the Marines is the envy of all the Army and it is destructive of army morale to have taken from them the blue uniform in which so much of the history and tradition of the Army was made. In so far as the Marines are concerned, the Great War established the fact that the so called winter field uniform was a very undesirable part of the uniform because of the difference of its appearance from that of the olive drab of the Army and its great similarity to the field green of the Germans, and I am told that until the Marines of the Fourth Brigade were put into Army uniforms, they were shot at several times by our own troops under the impression that they were Germans.

Certainly no lasting tradition can be built around that uniform, but the blue and the khaki of the Marines is the uniform in which most of the history of the Corps has been made, and it seems fitting that those uniforms should be kept while the so called winter field or forestry green uniform might well be placed in storage until such time as a marine force is called into the field in a cold climate. If such a scene of action is sufficiently cold and snow is present, white, the white of the old Russians, large enough to go over any warmer clothing, would be a suitable uniform.

But this is a digression; however, tradition and uniform should be so intimately connected that one could not be changed without more or less injuring the other, and it would therefore seem desirable to preserve the essentials of well established uniforms, in order that men could carry with them when dressed in the uniform of their arm the feeling that they were in a proper dress and the feeling that they were carrying on the tradition of a great body of noble men who had gone on while wearing that same uniform.

Let us take an example of an historical utterance, the famous "Don't give up the ship"; take at random fifty boys in the Navy and ask them who said it and where; I venture to say the answers will be disconcerting. But that immortal sentence should be a living embodiment of the spirit of the United States Navy, and if all training stations devoted a certain amount of time every day to it and to similar teachings the spirit of those great naval officers who made the United States what it is would go on and would be bound to enter into the morale and spirit of the young lads who form our Navy today.

Some one has said that the spirit of the British is expressed in the saying, "As it was in the beginning, is now and ever shall be"

and that the American spirit is expressed in the saying, "As it was in the beginning, is now, but there's got to be a change." Progressive, yes, but isn't that sort of progress made at the sacrifice of something finer and better and which we could well do without? I think there are many things which we could save without change for the sake of the preservation of the tradition with which they are surrounded.

Would it not be a matter of pride to every man of the Marine Corps, no matter what his rank or station, to know that the Fifth and Sixth Regiments, even if represented by only a paper organization and one or two officers and men, was still a living thing? I think it would. Would we not point with pride to the record of those outfits and feel prouder and better for knowing that they are living and carrying on the traditions of Belleau Wood and the other famous fields on which they fought and established the record of which every Marine can be proud? I believe so. Why then should any exigency of the service be such as to exterminate the existence of those wonderful regiments, laden as they are with glory, not only for themselves but for the Marine Corps and the naval service.

The decorated flags of those regiments should not rest in the office of the Major General Commandant, but should be in the regimental office, and should be displayed on all occasions of ceremony, and a shrine should be where those flags are; a shrine at which the young men of the Corps, both officers and enlisted men, could go with a feeling of reverence for the regiments which so nobly carried on under the storm and strife of the Great War.

It seems to me that thoughtlessness is the reason why we do not pay more attention to tradition and the preservation of it. We live today and tomorrow but never yesterday. Why? I think because we are somewhat afraid of being thought slow and because we are all ashamed to give vent to any expression of emotion which the history and tradition of any unit of our service may cause us to feel.

Every war produces individuals of almost all ranks who make history and tradition and as a rule the records of these events are only to be found after search in the musty files of some archive. Then after they are sought out and made public the very people who should be most interested in carrying on the tradition and the history so made are the most neglectful of it. Why is that? I be-

lieve it to be because of a false modesty about exploits which are historical and which should be blazoned to the men interested by every means at our disposal.

I do not mean that the individual should go about tooting his own horn, but I do mean that the organization of which such an individual may have been a member should exercise every power it may bring to bear to have the exploits of the individual or the organization a living, breathing part of the every-day life of that organization by which its spirit will be bettered and its morale raised. As a rule men who have distinguished themselves do not go about blowing their own horns and we praise their modesty, which is as it should be, but I believe the commanding officer of an organization to which such an individual may belong can find many occasions on which to keep before the members of the organization the proud record of such an individual and certainly there are presented numerous occasions on which the record of the organization can be read to the members and the pride of the organization in itself raised to a high degree.

We take pride in the Marine Corps in reading striking parts of its record on the tenth of November each year, but the men who are present on the tenth of November are scattered to the four winds by the tenth of next November. But nearly every day in the year is an anniversary of some worthy exploit on the part of Marines and the daily formation for troop inspection could be made the occasion when a short talk could be made by the commanding officer of each unit, telling the men something in which we take pride which happened on that day. This preserves tradition; it builds pride in organizations, and it raises morale to a degree which is unrealized at present.

When Napoleon ordered that the name of "La Tour d'Auvergne" should be forever carried on the roll of his company after he had been called the "First Grenadier of France"; when that soldier had fallen pierced by bullets but with his face to the enemy, he established tradition which is a live thing today in the French Army. One of our officers was present during the World War when the roll call of that company was held and when the name "La Tour d'Auvergne" was called, the color sergeant answered, "Dead on the field of honor."

Does not the blood of every man tingle at that short recitation? Would not any man be proud of the heritage if such fell his lot?

I believe that the morale of that company must have been high and that it must have entered battle on every occasion with the living tradition of La Tour d'Auvergne serving as an inspiration and as a worthy tradition for every man in the company to aspire to.

All great leaders have realized the necessity for appeal by psychological means to the spiritual side of their men. When Alexander refused to drink until his soldiers had quenched their thirst in a desert campaign, he knew that he could bind himself more effectively to his troops by that apparently simple action than by any amount of talk. Napoleon not only raised the morale of his troops to fever heat by his statement that "Every man carries in his knapsack a marshal's baton," but he on more than one occasion made good his statement by making marshals of men whose military careers had been commenced as enlisted men.

Such things come to be tradition in armies and they are the very essence of leadership. Therefore, by creating that which may become tradition and then by preserving that which is already valuable and worthy tradition, pride of organization can be raised to the nth power and kept there so long as the tradition is kept alive.

Sergeant John Quick of the Marine Corps was a member of the First Battalion which landed at Guantanamo Bay in the Spanish American War, that battalion which fought a force, considerably greater, for more than 100 hours. During a part of the action artillery fire was requested by signal from one of the American ships which was in support of the battalion. Sergeant Quick sent the message to that ship by standing on the sky line of the ridge where his comrades were deployed and signaling them as unconcernedly as if he had been in the shelter of a fortress. The fire of the Spanish was more than redoubled when his figure was given them as a target and yet, without a falter or a hesitation, he sent and had his message acknowledged by the ship and then calmly took his place in the line. His act was rewarded by a Medal of Honor and now that Quick is one of those who sleep in France, having made the great sacrifice over there, I think it would be a fitting tribute to him to have on each anniversary of his signalling at Guantanamo, under a heavy fire and with his back turned to the enemy, that exploit read to every man of the Marine Corps as an inspiration which could not but help each individual increase his morale and pride in his Corps.

How many Marines, either enlisted men or officers, can tell you how it was that Sergeant Dan Daley wore two medals of honor? Very few I venture to say, and yet the constant presentation of Daley's high sense of duty and his magnificent record for the consideration of officers and men could not but be an inspiration to others to do likewise.

It would not be a difficult matter to hang in every squad room of a barracks the pictures of honored enlisted men with a short excerpt of their records with the picture. Ordinarily this method would be too passive in my opinion, but it would all help and it should be supplemented by a daily reading of some short record of some man of the Corps who had distinguished himself.

Pride in the organization is what we must foster by every means. Let the enlisted man who walks down the street, neat, well set up, and a credit to his organization, feel that he is a responsible member of an organization which has unlimited pride in its achievements and record; make him feel that he is responsible for that record and, with few exceptions, the confidence placed in the man to bear out tradition will not be misplaced. Let him have a daily knowledge of some act of gallantry performed by some man who wore the same uniform he wears and eventually an unbounded pride of organization will spring into being and remain a constant spur to every enlisted man as well as officer.

At this point I am forced to confess that ignorance on the part of officers about their own Corps record and history is greater than it should be. They are required to be examples to the men they command, but I can think of many cases where, if they are examples at all, it is a very poor example. Therefore, our Basic School should have as a part of its course a history of the Corps and a history of striking individuals of the Corps. Let the officers be examples in this respect and the men will rapidly follow.

Therefore the upbuilding and maintenance of tradition should be a part of the schooling of every officer, and advantage of every occasion should be taken to bring before the men and emphasize both individual histories and organization records. Great offices were organized during the war to build and increase morale and much building and increasing was largely based on example. However, to wait for the outbreak of a war or other emergency to build up something, which should be a very part of the individual at all times during his connection with the government service, is to

create a growth which is not healthy and which dies when the emergency for which it was created is no longer an issue.

Who can question the inspiration which the rising generation of naval officers would receive from the presence of the *Constitution* and the *Hartford* at Annapolis? Who could doubt that in a war of the future an admiral bearing in mind the famous, "Damn the torpedoes, go ahead," might not adopt such as his course of action and thus establish undying fame for himself and his service.

So the inspiration of such deeds, the ships on which they were performed being living, real, tangible assets, must be reflected in the minds of those youngsters whose characters are building, and on whose action the future of our country may rest. Therefore let us put those living inspirations where they will be ever present during the character building stages of their lives, and let us add to them the daily instruction which we can glean from the rich archives of the naval profession and try to build into their characters the same pride of race, the same pride of profession, the same pride of service that must have inspired the men whom we take for our examples in this instruction. It is indeed correct and proper to die for one's country, if in so doing one can inspire the generations which are coming with the same zeal and patriotism as our naval heroes of the past displayed.

BRAZIL'S MARITIME SITUATION

By Commander C. C. Gill, U. S. Navy
(Member of U. S. Naval Mission to Brazil)

DIFFERENT countries are faced by different maritime problems. The bearing that sea power has on the development of any one country depends upon the particular situation in which that country finds itself. A nation whose interests are mainly continental is less directly affected than is one whose interests are chiefly maritime. In order to arrive at a correct appreciation of the interests of any individual country in sea power, stock must be taken of its maritime situation, together with the special circumstances, geographical and otherwise, that condition it.

What, then, is the maritime situation of Brazil? To what extent are her people dependent upon sea communications for social intercourse and for carrying normal peace-time business? And as a consequence, what is Brazil's naval problem?

In a general way, according to the land and water that surrounds them, countries are classified, some as continental, like Russia and Germany, others as peninsular, like Italy and Spain, and still others as insular, like Great Britain and Japan. For the majority of countries, this geographical classification also indicates, with fair accuracy, their relative interest in sea power. England and Japan are obviously more dependent upon sea communications than are Russia and Germany. As a rule, land-locked countries do less business by sea than those whose frontiers are mostly coast line. This rule has exceptions, however, and, in some cases, grave error may result if other equally important considerations are overlooked. Of these exceptions, Brazil is a unique example.

This country comprises a vast block of South America, 8,500,000 square kilometers in area, bounded on the north, west, and south by ten foreign countries and on the east by 3,600 miles of Atlantic seaboard. Approximately three-fifths of the Brazilian border is covered by her land frontiers; she has no distant colonies

or island possessions of importance; geographically, therefore, she is properly classed as one of the great continental countries of the world. But from this fact alone no hasty opinion should be formed as to her relative interest in sea power. As has been said, other factors besides mere geographical location must be considered before conclusions are drawn.

Foremost among these other considerations are means of communication. Communications are the *sine qua non* of social and industrial progress. What then are Brazil's means of communication, internal, for interchanges between the different sections of the country, and external, for trade and intercourse with foreign lands?

First, the internal communication system will be examined. For this purpose, it is convenient to divide Brazil into six sections as indicated on the map (See accompanying map). These divisions are not arbitrary, but have been determined by internal river and railroad lines of communication. Section number one is in the northwest and comprises the Amazonas and a portion of Matto Grosso; number two includes most of Pará and parts of Goyaz and Matto Grosso; number three, the remaining east end of Pará, and the states of Maranhão, Piauhy, and Ceará; number four, the small eastern states of Rio Grande do Norte, Parahyba, Pernambuco, and Alagoas; the fifth, Sergipe and Bahia; and section number six, the largest and, economically, the most important, comprises the entire south of Brazil, including Minas Geraes, Espirito Santo, Rio de Janeiro, São Paulo, Paraná, Santa Catharina, Rio Grande do Sul, and the remaining portions of Matto Grosso and Goyaz. It is to be noted that the dividing lines are so drawn that there are no railroad connections between any two of these six sections.

As the eye passes over the map of Brazil, from the north to the south, the distinctive form that railroad development has taken is at once appreciated. In varying degrees of expansion we see no less than sixteen local networks of railroads converging toward the principal seaports. Six of these are in the south section and have connecting branches; the other ten, in the east and north, have no connecting lines. Inter-communication between these different local systems is, for the most part, dependent upon ships. Interchange between the states in the east and those in the north and south is effected exclusively by sea.

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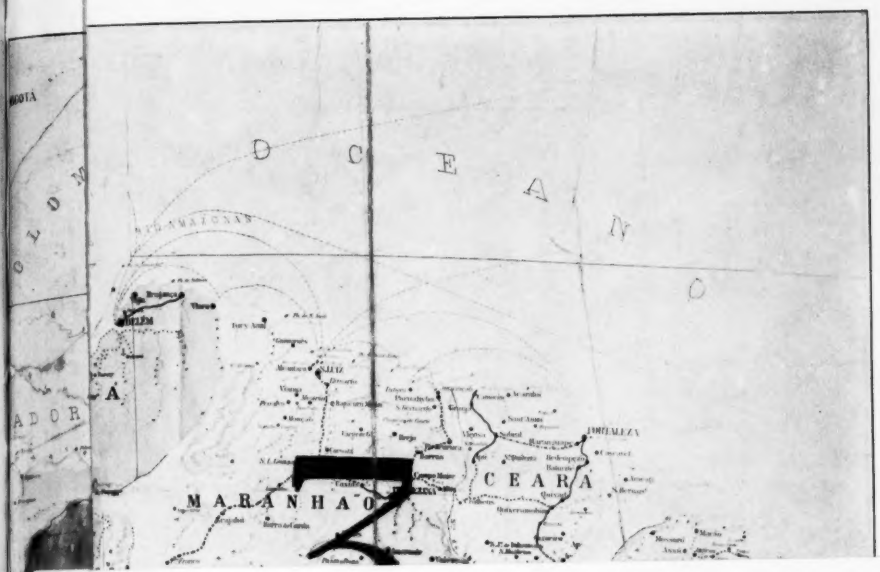

BRAZIL DIVIDED INTO SIX SECTIONS FOR PURPOSE OF

OCEANO
CEARA
MARANHAO
PARAHYBA
PERNAMBUCO
ALAGOAS
SERGIPE
BAHIA
GOYAZ
MINAS
GERAES
ESPIRITO SANTO
RIO DE JANEIRO
PORTO ALEGRE
1
2
3
4
5
6

UNIV. OF MICH.

Sections one and two include the valley of the Amazon and its tributaries. In this vast territory steamships can navigate many thousands of miles of river. Throughout sections one and two, with the exception of a few miles of track at Madeira—Mamoré built around a series of waterfalls, there are no railroads. Up to the present time water travel has been the only means of communication in this area. The distance of these parts from the economic center of Brazil is evidenced by the fact that Manáos can be most quickly and easily reached from Rio de Janeiro by a sea and river voyage of 3,200 miles. This is equivalent to a voyage from Rio to Cape Town, Africa. *Section three* is in four separate parts. Each of these parts has its local railroad system, but as yet there are no connecting lines so traffic between them is conducted chiefly by water. *Section four* comprises four small, but important, eastern states; all of these are connected by railroads. *Section five,* Bahia and Sergipe, has the two northern ports Aracajú and São Salvador connected by railroad, but the smaller ports to the south are isolated by land and intercourse with them is conducted by sea. *Section six,* in the south, is the largest, the richest, and the most advanced in means of land communication. All the nine states that comprise it are connected by railroad lines; these lead into the interior of Goyaz and Matto Grosso, and it is possible to go by rail the entire distance from Victoria, in the north, to Rio Grande, in the south; between the widely separated points along the coast, however, the bulk of traffic still follows the easier and cheaper mode of travel by sea.

It is readily seen that the industrial, social, and political heart of the Republic is located in the south section. Although other sections in the north and east are also rich and offer great promise for the future, still, because of climatic conditions and the natural physical characteristics of the country, the economic center of Brazil is, and must remain, in this south section.

Contemplation of this extraordinary situation leads to some rather startling conclusions: Although geographically Brazil is a compact continental block, when practical means of internal communication are taken into consideration she resembles a country comprising a mainland and a series of islands. Section six in the south corresponds to the mainland, while the other sections in the

north and east correspond to outlying island possessions, separated from the mainland and from each other by divers sea distances.

For political ends, social intercourse, and business purposes, the distances from the economic center of the country to the states in the north and east must be measured not in land miles across untraversed mountains, morasses and forests, but in sea miles along the navigable water routes. In this connection it is interesting to note that, by constitutional provision, Brazil's theoretical federal district is reserved in the state of Goyaz, in the geographical center of the Republic; but politically, socially, and economically, this district is not centrally situated. On the contrary, for practical purposes, it is on a remote frontier. The fallacy of this geographical determination has been recognized and the actual capital has been wisely located in the seaport of Rio de Janeiro, where the seat of government is in closer touch with all parts of the country.

Nor are there any indications that this condition will be materially changed for many years to come. The present communication situation of Brazil is the natural one. The physical characteristics of the country are such as to make through-railroad construction extremely costly. The distances and obstacles are so great that economic development will continue to follow the water routes and the local systems of railroads expanding from the seaports. Brazil is exceptionally favored with navigable rivers threading the interior and with deep-water ports scattered along her extensive coastline. Experience has taught that railroads cannot successfully compete with the water highways donated by a bountiful nature. Eventually, trans-country railroads will come, but it is to be foreseen that even after Brazil has through-railroad lines to the north and to the east, the sea routes will still continue to be the main lines of travel and transportation.

This brief survey of the internal communication system shows to what degree Brazil is dependent upon ships for the conduct of home affairs. In a strictly national sense, there are few countries in the world that have a more vital interest in sea power than has Brazil.

Now we shall turn to an examination of the external communication system—the means of intercourse and trade with foreign countries.

As a corollary to the large percentage of inter-state trade that is water borne, one would expect to find a large part of Brazil's foreign trade conducted by sea. This is the case, but the relative insignificance of foreign trade by land is out of all proportion to what would be inferred from the length of land frontier. Here, again the actual condition is contradictory to the geographic situation.

As has been remarked, about three-fifths of Brazil's border is land that touches ten foreign countries, and extends 5,400 miles (10,000 kilometers). But the foreign trade across these borders is so small that, in comparison with the total of Brazil's trade, it is almost negligible. As calculated by the *Directoria de Estatistica Commercial of the Ministerio da Fazenda* and published in 1924, the value of foreign trade that passes across the land frontiers is a little over .005 per cent of the total. In other words, more than 99 per cent of Brazil's foreign trade is conducted overseas.

The map shows how few are the railroads that lead to border countries. The small volume of traffic there is chiefly by river, and only in the extreme south is it possible to make a continuous trip by rail into a foreign country. In this condition, therefore, Brazil, as a continental country, is unique because in the practical aspects of external communications; she resembles an island.

This situation, like the internal communication situation, has followed as a consequence of natural causes, and will probably continue for generations to come. The physical characteristics of South America make trans-continental railways costly. The demand for trade between Brazil and her northwestern neighbors does not operate in such a way as to encourage the rapid development of land communications. These will come in course of time, but even so, in the future, as in the past, it is logical to infer that the great percentage of Brazil's foreign trade will continue to be conducted in ships.

A nation's sea power includes both ships of commerce and men-of-war. The uses of the former for passenger service and trade are well understood. In a general way, the law of supply and demand determines the number, size and employment of the ships that make up the merchant fleets. The naval part of sea power is also determinate and not a matter of mere guesswork. The purpose of naval fleets is to safeguard maritime interests, to

uphold national dignity abroad and, if need be, to fight in national defense. Just as the law of supply and demand determines the composition and employment of the merchant fleets, so do the necessities of security and protection determine the composition and employment of the naval fleets.

The merchant fleet of Brazil has progressed steadily to meet her social and industrial needs. This is shown by statistics. In 1924, the total tonnage of ship entries in Brazilian ports was 32,909,181 as compared to 23,117,156 in 1921. Of this, 13,177,249, in 1924, and 9,152,917, in 1921, was under the national flag. This measure of ship movement, both domestic and foreign, is much greater than that carried on in the ports of any other country in South America. Brazil has a longer coastline, more numerous ports, more navigable rivers, a larger tonnage of shipping, and a greater volume of seaborne trade than any of her neighbors. Viewed from almost any angle, in a commercial sense Brazil is the foremost maritime country in South America.

On the naval side of Brazil's sea power, however, we find that development has not proceeded in the same way. Naval needs are not so readily understood as are commercial needs. Also, men-of-war are expensive and are not self-supporting in the sense that merchant ships are. Notwithstanding, in the world as it now exists, fighting ships are just as essential to the welfare of the nation as are merchant ships.

As has been said, the principal rôle of naval power is to safeguard maritime interests and to protect national and colonial shores. To determine the naval establishment that will accomplish this end there is no general formula that can be applied to all countries. A certain kind of a fleet might do very well for one nation and not be suitable at all to meet the needs of another. One country may require a powerful high sea fleet of long cruising radius, while the special situation of another country may call for a fleet of comparatively short cruising radius with numerous coast defense submarines and torpedo boats. For example, the German Navy in 1914 was designed primarily to fight defensively in home waters and her fleet was not built for long cruising. On the other hand, the naval needs of England determined a fleet of long cruising radius, ready to go to any part of the world in defense of her distant possessions.

In connection with Brazil's naval problem to safeguard maritime interests and protect home shores, there is, in addition to the points already considered, a topographical condition that requires careful attention. This is that along the entire length of her 3,600 miles of sea coast there are no narrow waters; there are no large islands or irregularities of coastline to form seas, gulfs, bays, or straits. This unusual circumstance has an important bearing upon the determination of Brazil's naval establishment.

The influence this physical condition exerts can be demonstrated by contrast between the naval defense problem of Brazil and that of a country surrounded by narrow waters. For this purpose, let us consider the naval situation of Germany in the World War.

From the map it is seen that almost the entire northern boundary of Germany is sea coast. Most of this fronts the Baltic. Only a small portion faces Heligoland Bight and the North Sea. In between is the Danish Peninsula, cut by the Kiel deep-water ship canal. Vessels can reach the Baltic either by way of the Canal or by the longer voyage north around Denmark.

In this situation it is apparent that approach for naval attack on the German coast could be made by only two routes: one by way of Heligoland Bight and the other by the much longer northern passage via Skagerrack and Kattegat. It is also seen that the Kiel Canal gave the defending navy an interior position from which it could move to intercept an enemy approaching by either one of these routes. This condition permitted a concentration to cover the entire coast. All the German ports and important maritime interests in the Baltic could thus be protected by mine, torpedo, and submarine concentrations covering these two routes, supported by the mobile fleet, inferior in strength to the enemy but operating in narrow waters from the advantageous interior Kiel Canal position.

Turning now to Brazil we find her naval situation totally unlike that of Germany. Had there been no narrow waters in Europe and had Germany's coast, like Brazil's, fronted the broad Atlantic, the course of naval events would have been altered. In the case of Brazil, a fleet contained by superior forces at any one place like Rio de Janeiro, Santa Catharina, Recife or the Amazonas would not be able to perform a defensive service comparable to that actually performed by the German fleet contained in Heli-

goland Bight, at the Kiel Canal. If the Brazilian fleet should ever be contained by a superior enemy, local concentrations of mines and submarines would avail little, because 3,000 miles of open coast would be exposed to attack. A few enemy cruisers along the steamer routes would be in position not only to threaten foreign trade, but also to menace the interstate lines of communication. Under such circumstances, industrial life of the country would be greatly affected, and history teaches that military disaster and political troubles soon attend such conditions.

It follows, therefore, that Brazil's naval needs are not like Germany's: whereas the latter's naval defense was well served by a fleet of short cruising radius—supported by minefields and submarine concentrations—Brazilian naval defense demands a fleet of long cruising radius that can go to sea at any time, in any weather, and proceed long distances to whatever flank or point that may be menaced and there locate and defeat the enemy.

In broad perspective, the fundamental aspects of Brazil's maritime situation have now been reviewed. It is seen how dependent Brazil is upon the sea for internal and external communications. It is also seen how Brazil's naval necessities of security and protection are conditioned by a long, regular ocean coastline.

The destiny of Brazil, therefore, both in national development toward a more prosperous, more unified republic, and in advance toward a position of greater influence in the family of nations, demands freedom and facility of communication by sea. The inevitable conclusion is that Brazil has, and always will have, a paramount interest in sea power.

BAINBRIDGE UNDER THE TURKISH FLAG

By Rear Admiral Livingston Hunt, (S.C.)
U. S. Navy, Retired

THIS is a narrative, in outline, of the events which preceded and led to our naval war with the Barbary powers, and it will reveal in its progress some incidents of a picturesque and exotic character, culminating in the extraordinary spectacle of a brave officer of our Navy hauling down the American flag at the command of a pirate despot, hoisting in its place the flag of that despot, saluting it with seven guns, and later going to sea under its folds as if it represented the authority to which he owed obedience and loyalty.

To understand the times of which I write—that is, from 1783 to 1800—an American must first grasp the fact that a country without a navy, without funds in the public treasury, and without a government that governed, was what the United States was during most of the years mentioned. Foreign commerce in our merchant ships was a bait to any power that deemed itself strong enough to pick a quarrel with us. To any one of the Barbary states—being corsairs and being commanded by Mohammed to despise all Christians—the rights of our ships in the Mediterranean, whether in peace or war, were subject to laws which might accurately be described as the laws of prey, as practiced by wild animals. England, as the dominant power upon the seas, and resentful of any other nation's attempt to win from her any of her sea trade, looked with approval upon the piratical attitude of the Barbary states towards all powers and especially towards the United States. The appearance of our trading vessels in the Mediterranean in 1783, just after the Revolution, displeased her; and in July of that year we find Benjamin Franklin, who was then our minister to France, writing as follows to Robert R. Livingston, our Secretary of Foreign Affairs, in regard to the corsairs of Algeria: "I think it not improbable that those rovers may be privately encouraged by the English to fall upon us and to prevent our inter-

fering in the carrying trade; for I have in London heard it is a maxim among the merchants that if there were no Algiers it would be worth England's while to build one."[1]

All the maritime world in the Mediterranean waters was then divided into the Christians and the Mohammedans, and there had been intermittent warfare between them for upwards of three hundred years. We were joining the rest of the Christians in learning "that Turkey, Tripoli, Tunis, Algiers, and Morocco were the sovereigns of the Mediterranean, and that no nation could navigate that sea without a treaty of peace with them."[2] So spake Abdurrahman in an interview with John Adams when he was our minister to England. And in order to secure this peace each one of the great nations of Europe had humbly paid tribute in money and presents from time to time to one or more of the Barbary states. Their submissiveness, however, was always accompanied by another feeling—a desire to bring down the corsairs upon the backs of some one of their Christian brethren with whom they happened to be at war, or knew that some day they would be at war.

Into this ancient and wicked order of things behold the young American republic arriving in 1783. Before the Revolution we had been only a colony of England, and therefore our ships in the Mediterranean had received the same protection from the corsairs as those of the mother country herself; but now we appeared in those seas as a new country, and under our own colors. It was the strange flag which roused the curiosity and cupidity of the Algerines, the strongest of the corsair peoples, and in July 1785, having received neither tribute nor overtures for a treaty from the new country, they proceeded to exercise their ancient right to commit piracy. They seized, off the coast of Portugal, the schooner *Maria* of Boston, and the ship *Dauphin* of Philadelphia, brought them into Algiers, and put the twenty-one captives from both ships to work as slaves of the Algerine Government. These Americans, regardless of rank, were made to wear "an iron ring on the ankle, which was the badge of public service and protected the wearer from insult and abuse by the Turkish soldiers."[3]

[1] *Autobiography of Franklin.* John Bigelow, V. 3, p. 228.
[2] *Our Navy and the Barbary Corsairs.* G. W. Allen, p. 32.
[3] *Our Navy and the Barbary Corsairs.* G. W. Allen, p. 20.

The Dey of Algiers then let it be known that future depredations on American commerce could only be avoided by an agreement on our part to pay annual tribute to him, and that the captives from the *Maria* and *Dauphin* could be redeemed at rates which ran from $1,400 for a sailor to $6,000 for a captain, or a total of over $59,000. Shocked by such proposals, our government yet felt itself incapable of making the only proper response, namely, to declare war on the Dey and despatch an armed squadron to deal with him. But at that time, 1785, our national treasury was so nearly empty, that of the continental taxes which had been assessed in 1783 only one-fifth had been paid by the middle of the year.[4] Poor and puny young nation! What wildest imagination could have foreseen any faint indication of what it was to become?

"The States," wrote John Adams, from London on June 6, 1786, to Thomas Jefferson, our minister in Paris, "must either buy the Barbary powers or fight them"; but the hard facts were that they had not the money to do the one, or the Navy to do the other. "The craven policy of Christendom," continued Adams, "had made cowards of the sailors of Europe before the standard of Mahomet," and "it was intolerable" for the United States "to be so indifferent." Yes, it was, but what was to be done? This was what was done. With a Congress only able, or else only willing, to appropriate the sum of $200 each for the ransom of the twenty-one American captives, we decided to enter the ignoble list of tributaries to the pirate nations. We smothered the humiliation felt in doing this, and we resolved to try, through a strange foreign agency which will be described later, to cheapen the rates of ransom which had been flung in our faces by the Dey of Algiers.

It was February 1787—nearly two years after the capture of our citizens—before Jefferson was in a position to send from France, for the information and action of Congress, an account of his dealings with an order of monks who had existed in France for six centuries. They were known as the "Order of the Holy Trinity and Redemption of Captives," and called themselves *Les Mathurins,* after the name of their founder. The sole cause of the existence of this band of saint-like and self-sacrificing men was to effect the ransom and rescue of their fellow-countrymen who had

[4] *History of the American People.* J. B. McMaster, Vol. 1, p. 248.

been taken prisoners by foreign enemies, especially by the pirate countries of north Africa. In a letter to Adams in England, Mr. Jefferson thus describes these monks: "There is here, [in Paris], an order of priests, called the Mathurins, the object of whose institution is the begging of alms for the redemption of captives. They have agents residing in the Barbary States who are constantly employed in searching and contracting for the captives of their

FATHERS OF THE REDEMPTION.
(*Pass. Illust. de Barbarie*, 1637.)

From "The Barbary Corsairs" by Stanley Lane-Poole. Putnam, New York, 1890.

nation; and they redeem at a lower price than any other people can. It occurred to me that their agency might be engaged for our prisoners at Algiers. I have had interviews with them, and last night a long one with the General of the Order. They offer their services with all the benignity and cordiality possible."[5]

To see Thomas Jefferson on that night in his lodgings in Paris pleading—possibly in French, more probably in Latin, for the

[5] *Writings of Thomas Jefferson.* Compiled by Lipscomb and Branch. Vol. VI, p. 47.

services of foreign monks to do what he had declared a few months earlier should be done through the agency of war, is a scene so curious as to make one forget that it also carries with it a message of humiliation. The Mathurins, he says, redeemed "at a lower price than any other people"; that is, our fellow-citizens were worth bargaining for like any other merchandise. How different this attitude from our conduct only a few years later when we sent Preble with a fleet to bombard Algiers! Or, to come down to modern times, how different Jefferson's appeal to the foreign priests from the message of John Hay in 1905 to the Sultan of Morocco: "Perdicaris alive or Raisuli dead."

Our Congress listened to the story Jefferson had to tell; and on September 19, 1787, he received its authority to make use of the "Fathers of the Redemption" for the purpose of rescuing our prisoners from slavery. For the next two years endless attempts were made, in secrecy and with much difficulty, by these zealous priests, to achieve the redemption of the American prisoners at a price in accord with the scanty appropriation which had been granted by Congress for that purpose. But the only result was the ransom of one man in July 1790, and in the meantime six of the other prisoners had died. Then all further negotiations through the Mathurins were brought to an end by no less an event than the French Revolution, which abolished their order, as it did all religious orders in France. In April, 1791, Richard O'Brien, the former master of the ship *Dauphin,* and now in the sixth year of his captivity to the Dey of Algiers, managed to forward a long petition to Congress, begging it to grant such powers to its representatives in Europe as to enable them to extricate the fourteen unfortunate men who were left, from "bondage and adversity." By "extricate" he meant, pay a large cash ransom. On February 22, 1792, the United States Senate showed a real desire to lift the government out of the slough of inaction and indifference into which it had sunk, by passing a resolution to pay to three of the Barbary states—Algiers, Tripoli, and Tunis—an annual tribute of $100,000 for the privilege of trading in the waters of the Mediterranean. If this statement, with the dates altered to current times, could appear on the front pages of our newspapers today we would be able to realize how helpless, and how deprived of the tonic of pride, our young government was in 1792.

But there are greater surprises yet in store for the student of this period of our early history. Few readers will be prepared to come upon the following words from the pen of George Washington, President of the United States, addressed to the Senate on May 8, 1792:

> If the President of the United States should conclude a convention or treaty with the government of Algiers, for the ransom of the thirteen Americans in captivity there, for a sum not exceeding forty thousand dollars, all expenses included, will the Senate approve the same? Or, is there any, and what greater or less sum, which they would fix on, as the limit beyond which they would not approve the ransom?
>
> If the President should conclude a treaty with the government of Algiers for the establishment of peace with them at an expense not exceeding twenty-five thousand dollars, paid at the signature, and a like sum to be paid annually afterwards, during the continuance of the treaty, would the Senate approve the same? Or, are there any greater or less sums which they would fix on as the limits beyond which they would not approve of such treaty?[8]
>
> —George Washington

When George Washington could make these suggestions, it is for us to pause before rushing to censure the conduct of our government as avoidable. On the contrary, we can feel certain that it must have been required by the circumstances.

On the same day that the President submitted his proposals the Senate approved them, with the addition of raising the initial sum to be paid to the Dey on signing a treaty, from $25,000 to $40,000. With the authority thus granted, the administration made arrangements for the deposit of funds abroad, and for the despatch of a special agent to make a treaty with the Dey. But the delays of correspondence and of transportation of those days caused nearly eighteen months to drag by before the American agent could find himself at Gibraltar, ready to take the first available vessel to Algiers, where he was expecting to come to grips, diplomatically, with the impatient Dey. But he was too late. At this very moment, that is, in October, 1793, the Dey, furious at the prolonged postponement of the delight of seeing at his feet, as it were, a tribute of money and of stores, gave orders to his xebecs to go through the straits of Gibraltar and to seize any American vessels they might come across. No fewer than ten of our ships were thus captured within a few days, and brought

[8] *American State Papers.* Foreign Relations. Vol. I p. 136.

into Algiers, with a total of 105 prisoners. There were now 119 American citizens in the power of the Dey, all of them wearing the ring on their ankles which indicated that they were his slaves. This, together with the loss of twelve vessels, was the net result of our eight years of submissiveness, timidity, and financial impotence.

The news of the additional captures of our ships and men was laid before Congress in a special message by President Washington on March 3, 1794. This aroused enough of its members to a sense of the disgrace of our condition as regards protection from foreign insult, to make them pass an act which is deserving of our attention, for it was approved by Washington on March 27 and was to become the actual origin of our Navy of today. It was entitled "an act to provide a naval armament," and the preamble contained the following words: "Whereas the depredations committed by the Algerine corsairs on the commerce of the United States render it necessary that a naval force should be provided for its protection."[7] This important act authorized the building or the purchase of six frigates, but contained a cautious proviso that the law was not to be fulfilled if in the meantime the United States and the regency of Algiers should negotiate a treaty of peace. The very language of the act shows no intention on the part of Congress to establish a permanent navy, but rather a hope that even a temporary one might be found unnecessary. But in the end, events were slowly to shape themselves in favor of a permanent one.

Now that the Dey was lord of about a hundred American slaves, he showed no desire to discuss the terms of a treaty until first assured that there would be nearly a million dollars in the business for his pocket. Heart-breaking delays, and the appearance of the plague among our prisoners had reduced their numbers to eighty-five when in the autumn of 1795 they sent a petition to the clergy of all denominations in the United States requesting their prayers for deliverance. It was signed for them all by Richard O'Brien who ended the petition in these words—"Thus prays a small remnant who are still alive; thus pray your fellow-citizens chained to the galleys of the imposter Mohamet."[8]

Time again dragged on. At last on March 2, 1796, a treaty arranging the matters of ransom and tribute was actually ratified

[7] *U. S. Naval Chronicle.* C. W. Golsborough, p. 53.

[8] *White Slavery in the Barbary States.* Charles Sumner, p. 82.

by the President and Senate. The last clause of this amazing document reads, in substance, as follows: "Art XXII . . . The Dey will observe the treaty on consideration of the United States paying annually the value of 12,000 Algerine sequins [21,600 dollars] in maritime stores."[9] If, in the business of examining the history of these strange times, so unlike our own, and equally unlike the previous days of Lexington and Concord—we imagine that this treaty marks the last word of our humility towards the pirate states of north Africa, let me turn aside for a moment to quote from another treaty made by us in the following year, and also made through the agency of the Dey of Algiers. It was a treaty with Tripoli, and was ratified by Washington's successor, John Adams, in June 1797. The eleventh article of it reads, in substance, as follows: "As the United States government is not founded on Christianity nor opposed to Mohammedanism, religious differences shall never disturb the harmony of the parties."[10]

In accordance with the proviso of the act of Congress which had authorized the treaty with Algiers, it, of course, became necessary for the government, as soon as the treaty was signed, to cease all further effort towards building or purchasing any ships for a navy. But, General Washington urged Congress on March 15, 1796 not to throw away the work already done on the six frigates which the act had provided for, with the result that Congress agreed to finish three of those vessels out of the six. Thus grew into life the present Navy of the United States; thus shaped themselves upon the waters the stately *United States,* the *Constitution,* and the *Constellation.*

But our troubles with Algiers were by no means ended by the existence of a treaty; no treaty could do that, for our government, alas!—was too poor in funds—even with Alexander Hamilton to lash it into solvency—to pay, with anything like promptness, our debts to the Dey or to any other creditor. Our worried agents in Algiers were informed by the Dey on April 3, 1796, that unless the moneys long overdue him were paid within thirty days, he would disregard the whole treaty and send his xebecs out again into the ocean to seize American shipping. Frightened by such threats, they begged him to have patience; and by an ingenious suggestion, offered him a present of a handsome frigate of 36 guns. They had

[9] *Our Navy and the Barbary Corsairs.* G. W. Allen, p. 314.
[10] *Supra,* p. 315.

no right to do this, but they assumed the responsibility, trusting to the government at home to uphold them. Something in the untutored mind of the Dey responded to this unexepected offer; the child in him forgot its anger at the prospect of so splendid a toy. He not only agreed to wait, but he released our prisoners, who in July 1796 had the unspeakable delight of being free men again.

A description of the frigate-gift which was to reconcile him to our continuing arrearages of tribute, may not be out of place here. It was January, 1798, before she was sent. She was named the *Crescent* and is to be found on the lists of our men-of-war of the time. I quote from Fenimore Cooper, including his comments on the fact that we made the gift at all.

> The reader [says Cooper, writing in 1839] will obtain some idea of the spirit which may prevail in a nation, when it does not possess, or neglects to use, the means of causing its rights and character to be respected, by the tone of the following article, ... which would seem to be as much in unison with the temper of that day as one of an opposite character would comport with the spirit of our own times. . . . .
>
> "Crescent Frigate.
>
> Portsmouth, Jan. 20th [1798]
>
> On Thursday morning about sunrise a gun was discharged from the *Crescent* frigate as a signal for getting under way; and at 10 A.M. she cleared the harbor, with a fine leading breeze. Our best wishes follow Captain Newman, his officers and men. May they arrive in safety at the place of their destination, and present to the Dey of Algiers one of the finest specimens of elegant naval architecture which was ever borne on the Piscatague's waters. . . . . The *Crescent* is a present from the United States to the Dey, as compensation for delay in not fulfilling our treaty stipulations in proper time. Richard O'Brien, Esq., who was ten years a prisoner at Algiers, took passage in the above frigate, and is to reside at Algiers as Consul General of the United States to all the Barbary states.
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> The *Crescent* has many valuable presents on board for the Dey. . . . . Twenty-six barrels of dollars constituted a part of her cargo."[11]

The year 1798 found the United States forced to occupy itself with a matter of even greater importance than paying tribute to the Barbary States; it had to engage in a war, the "quasi-war" with France, which partially diverted its attention from the less important business of pleasing the Dey of Algiers. Our government now, in the face of France, actually had the spirit to institute a small navy. John Adams was President, and, like his predecessor,

[11] *Naval History of the United States.* J. Fenimore Cooper, 2nd Ed., Vol. I, pp. 240-1.

found it necessary to accept the Algerine situation. In fact when the Dey asked a certain favor of our government, President Adams stated that he thought the United States seemed "to be under peculiar obligations to provide this accommodation," for the reason that they had aided us in "our securing treaties with Tripoli and Tunis."[12]

Here it may not be out of place, with Washington and John Adams in our vision, to applaud the accuracy of statement of a historian who says that most of the prominent Americans of that time who favored our following the precedent of Europe in paying tribute to barbarians, "did what they thought was best for the country, and many of them were among the foremost public men of the day."[13]

Of course arrearages in our tribute continued, and became a habit. In February, 1799, we sent the Dey, in partial settlement of our dues, a present of two schooners named the *Leila Eisha* and the *Hamdullah,* both men-of-war, and both intended as substitutes for stores in arrearage. How long was this struggle to live up to the terms of our ignoble treaties to continue? We now actually had a small navy, but we continued to labor and groan under the conditions of our promises to Algiers and to the other pirate countries. The end was coming, though very slowly. In this narrative of humiliations it can be stated that the autumn of 1800 was the blackest hour of our whole fifteen years of disgrace as servants to a foreign master.

The story of the United States ship *George Washington* under Captain William Bainbridge will now be told. She was a little frigate of 624 tons, 24 guns and 131 men, and was ordered, in the summer of 1800, to sail for Algiers for the purpose of delivering tribute to the Dey. On September 8 she dropped anchor off Algiers, close under the forts of the town. William Bainbridge, her captain, only twenty-six years old, broad-shouldered, heavy in build—already an officer of distinction and destined to become much more distinguished—was proud of his little frigate, which was the first American man-of-war to enter the Mediterranean, but he loathed the object of her voyage to Algiers. Several days later he went ashore to join the American Consul, who was Mr. Richard O'Brien, the former prisoner of the Dey—now Consul General to

[12] *American State Papers.* Foreign Relations. Vol. II, p. 65.
[13] *Our Navy and the Barbary Corsairs.* G. W. Allen, p. 57.

all the Barbary states—and together the two proceeded to the palace of the Dey for an audience. To understand fully the purport of what then occurred, and the reason for the consequent events, we should first be informed that the Dey of Algiers was a vassal of the Sultan of Turkey, and that he had recently displeased his suzerain by making a separate treaty with France without having previously obtained authority to do so. To placate the Sultan was now the aim of the Dey, who planned sending a special embassy to Constantinople for that purpose, bearing gifts of money and rare articles of value. To carry out his design he decided there could be no more fitting vehicle than a foreign man-of-war, to be commandeered by himself, as he had the right to commandeer the vessel of any Christian infidel. The *George Washington* arrived in port most opportunely for his plans. The following description of what happened in the next few weeks is contained in a letter of October 9, 1800 from Consul O'Brien to Captain Bainbridge, and as I have never seen it in any history, I give it in its entirety, believing that the reader will not find it too long.

Copy of a letter from Mr. O'Brien to Captain Bainbridge.

Sir:

Your letter to me of this date I have received, and seriously considered its contents, and shall observe, sir, that from the day the United States' Ship, under your command, arrived in this port, and to this day, it has been generally supposed that regency would insist that the United States' ship should proceed to the Levant on the business or mission of this regency. On the 18th ult., when you went with me to pay your respects to the Dey, after a little Algerine ceremony, the Dey said he would want this ship as a favor from the United States, to carry his ambassador and presents to Constantinople, and return on the business to Algiers. I observed to the Dey that the captain or consul had no orders or power which, in any respects, could justify us in acquiescing in his demand; that, without the orders of the United States, we could not do any such thing; that we, having no orders, we could make no responsibility; that the captain could not protect his property against the Portuguese or Neapolitans; that your orders were to return to the United States, and by orders you could only defend your ship against French corsairs. The Dey did not seem satisfied with these explanations; that, shortly after, I repeated nearly the same objections on this business to the Algerine prime minister.

On the 26th ult. the Dey sent for me and the British consul, and asked me if I was still determined not to acquiesce in making responsibility, and carrying his ambassador and presents. I again repeated all the arguments which I made use of on the 18th ult., and added, as this vessel belonged to the

Government of the United States, and we having no fixed peace or treaty with the Italian states or with the Grand Signior, that this ship and crew would be in a very singular predicament in going to Constantinople on the business of the regency, we having no ambassador or consul at these places. The Dey answered, passionately, that these were all excuses; that other nations had rendered Algiers the like favors; but that, if the British consul would promise faithfully that a British ship of war would come here and go to the Levant on this mission, under this consideration he would let the American ship return to her country. The British consul, John Falcon, Esq., promised and assured the Dey (in my presence) that, as Lord Keith had promised to send a ship of war on this business, said ship might be daily expected. The Dey observed he would wait a few days, before he would fully determine, to see if the British ship would arrive.

The Dey remained undetermined until the 3d instant, when arrived at Algiers, from Mahon, A British ship of war of twenty-four guns, sent by the orders of Lord Keith, intentionally, to carry the ambassador and presents of Algiers to Constantinople. This business seemed finished and settled in order that the British ship of war would proceed on the business. But, from the 4th instant to this date, the Dey and ministry, and sundry persons of influence, started many difficulties relative to the mission of the regency going in the British ship, and finally objected to go. When this morning the Dey came to town from his country seat, and at 10:00 A.M. sent for me, and told me, without any alternative, the United States' ship should do him the favor to carry his ambassador and presents to Constantinople; that, if this favor or demand was not complied with, he no longer holds to his friendship with the United States.

On my declaring that I or the captain of the United States' ship had no orders, and could not justify ourselves to our Government to acquiesce, the Dey got very angry, and declared that he considered every thing we did say, or could say, to be excuses not to do him the favor he required; and if this favor was not acquiesced to, he knew what to do; that other nations frequently did it, and he could see no reason or motive which should prevent me, on the part of the United States, acquiescing to the request.

I again repeated to the Dey that I or the Captain could make no responsibility on the part of the United States; that we could not think his property safe under the American flag from the capture of his enemies; that the ship sailed dull or heavy; that, as it was war time, a thousand difficulties might happen. The Dey hastily observed that God was great, that all was on his head, that all difficulties would be surmounted.

I again declared that I or the captain had no orders which would, in any respect, justify ourselves to acquiesce. The Dey said he would justify us, and that the ship should go *per force*, and that we had no alternative but to do him this favor; that his mind and his minister's were soured against the British, and that, on this account, he rejected the British ship, and would insist his request should be complied with.

The Dey said he would send his flag to the marine to be hoisted at the mast head of the American ship. I answered I was very sorry on account

of his determination, and withdrew; went and explained to the prime minister all that had passed or was said on this business between the Dey and me.

The prime minister observed that the Dey's mind was so positively fixed and determined on this affair, that there would be no alternative but to comply, to prevent greater evils, reminding me of several overt acts of this regency to the consuls of other nations and their affairs; that he had tried to prevent the Dey from sending the American ship, but that it had no effect.

At meridian, I and Captain Bainbridge were sent for by the general of marine, when we made use of all those arguments which are heretofore detailed. The general of marine declared that there was no alternative but to comply. After our retiring from the marine half an hour, the general of marine sent to the consular house of the United States, to acquaint us that it was the orders of the Dey of Algiers that the flag of Algiers should be hoisted to the main-topgallant-mast-head of the American ship. That we answered, all was *per force;* that we were in their power, and the regency, of course, might do as they had a mind. Shortly after, we determined to see the Dey, and sent the American dragoman to acquaint the Dey that the consul of the United States and commandant of the United States' ship, demanded an audience.

At two, P.M. we were in the presence of the Dey, and stated all those difficulties, and all our former objections, that we had no orders, could not justify ourselves, and could make no responsibility. The Dey observed, that there was no alternate but to comply; that, in doing him this favor, he never would forget it on the part of the United States, and that, when he did, God would forget him; that he would write to the Government of the United States on this business of his making this demand; and assured Captain Bainbridge and me, that the United States would be highly pleased at the conduct of the consul and commandant in obliging the Dey and regency, agreeable to the request he made to us, as a favor from the United States. We observed to the Dey that this was a forced business, that, under this idea, and for the safety of his presents, it would be better that his flag should be hoisted at the fore-topgallant-mast-head than the main. The Dey declared he did not well know this business, but that those at the marine knew the custom; he believed it was at the main.

On this we went to the marine, told the general of the marine that if this United States' ship should haul down her pennant, and hoist the Algerine flag at the main, that said ship, agreeable to our laws, was out of commission, and would not be considered as a public ship of the United States; that the Algerine flag would be the same thing at the fore as the main, but to us it made great difference; that, by Christian laws, the ship would be considered as Algerine property, and not as a ship of the United States; that we made this remonstrance and observation to prevent difficulties. On this explanation, the general of marine got into a great passion; swore that the proposition and idea was made as an evasive pretence; that the ships of

war of Spain and France, and other nations, had acquiesced to hoist the Algerine flag at the main; that it was by the flag being hoisted there, that the mission was known and announced at Algiers and Constantinople. I explained to you, sir, that it was the custom, as I have seen and known, that the French and Spanish ships of war going on the like mission, hoisted at Algiers and Constantinople the Algerine flag at the main; that at sea he wore his pennant, and was more his own master. On this, you observed, it being a forced business, that, if there was a right to acquiesce to one point, there was no alternative but by the same rule to acquiesce to the other relative to the flag.

The general of marine and officers of the same said, if there was not a compliance on this business, agreeable to customs of all nations heretofore, that there no longer existed friendship between this regency and the United States. I observed, that I was sorry that the United States had so much reason to know Algiers, and that Algiers had no reason to know the United States.

We went on board; the Turkish flag was hoisted at the main of the United States' ship, and was saluted with seven guns, as customary.

Painful is the detail, but it contains a narrative of facts. To the truth thereof, witness my hand and seal of office, at Algiers, this 9th day of October, 1800.

I am, sir, very respectively, your most obedient servant,

RICHARD O'BRIEN[14]

To this letter should be added one of the same time from Captain Bainbridge[15] himself, to a friend, which is as follows:

The Dey of Algiers, soon after my arrival, made a demand that the United States' ship, *George Washington,* should carry an ambassador to Constantinople with presents to the amount of five or six hundred thousand dollars, and upwards of two hundred Turkish passengers. Every effort was made by me to evade this demand but it availed nothing. The light in which the chief of this regency looks upon the people of the United States, may be inferred from his style of expression. He remarked to me, "You pay me tribute, by which you become my slaves; I have therefore a right to order you as I may think proper." The unpleasant situation in which I am placed must convince you that I have no alternative left but compliance, or a renewal of hostilities against our commerce. The loss of the frigate and the fear of slavery for myself and crew, were the least circumstances to be apprehended, but I knew our valuable commerce in these seas would fall a sacrifice to the corsairs of this power, as we have here no cruisers to protect it . . . . I hope I may never again be sent to Algiers with tribute unless I am authorized to deliver it from the mouth of our cannon . . . .

[14] *Amer. State Papers.* Vol. II, Foreign Affairs, p. 353.

[15] *Life and Service of Commo. Wm. Bainbridge, U. S. N.* Thos. Harris M. D. Phila. 1897 pp 44-5. This letter bears no date.

Poor Bainbridge! Gallant Bainbridge! Bainbridge who twelve years later was to fight one of the bloodiest and most smashing of ship-duels, when he, in the *Constitution,* destroyed the British ship *Java*— how could such a man stand on his own quarter-deck with a Turkish flag flying over him? History answers that he did it because he had to. Let me quote from another sailor and fighter—even a greater man than Bainbridge—though both men were of the same breed: "My blood boils," writes Lord Nelson, the year before, in 1799, "that I cannot chastise these pirates." [i.e. the Barbary Corsairs.] "They could not show themselves in the Mediterranean, did not our country permit."[16] He too was commanded by his government to deal humbly and gently with the corsairs; but he seems to have been spared the degradation of lowering his country's flag to replace it with a Turkish one.

My story is almost done. It may be some compensation for the mortification of reading of Bainbridge's plight in this affair to learn that as soon as his ship got clear of the Algerine guns he hauled the Turkish flag down from the main, hoisted in its place our own. But, as the frigate did not sail from Algiers on her mission until October 19, we are forced to believe that for several days a foreign flag, and a corsair's flag at that, floated over a man-of-war by the name of *George Washington.* We turn away in self-abasement at the picture, but let us not yield too much to this feeling. The act of Bainbridge should be viewed in relation to the acts of a similar character which were in direct accord with the settled policy of all the greatest nations of Europe. If England, in 1796, could stoop, as she did, to "purchase the friendship of the Dey of Algiers and the release of some English prisoners at a cost of about one hundred thousand pounds;"[17] then the young country known as the United States, (but in 1800 still so *dis*united by the separate interests of its states, and by their reluctance to form one nation, as to make it very difficult to have a national treasury and a national naval defense), then that young country may be excused for its lack of a unified self-respect. That it did have some self-respect, and that the older nations of Europe had none at all in their relations with the Barbary pirates is the best that we can assert; but that is something, and it was to lead to important results. The news of the desecration of one of our quarter-decks

[16] *Life of Nelson.* Mahan, Vol. II, p. 229.

[17] *Life of Commodore John Rodgers.* C. O. Paullin. p. 94.

was too strong a dose even for our divided and immature nation to swallow. It was the origin of a new attitude on the part of the President and of the people. The Secretary of State, James Madison, wrote as follows, on May 20, 1801: "The sending to Constantinople the national ship of war the *George Washington* by force under the Algerine flag, and for such a purpose, has deeply affected the sensibility not only of the President but of the people of the United States."[18] In June of the same year, 1801, we sent a squadron of four men-of-war under Commodore Richard Dale to the Mediterranean to observe conditions in regard to the corsair countries, and if necessary to fight. This was the beginning of the end—an end which, although it did not come till three years later, was to wipe the Barbary pirates off the seas, so far as our own nation was concerned. As an English historian has observed: "To the United States belongs the honor of having first set an example of spirited resistance to the pretensions of the Corsairs:" and again—referring to our treaty with Tripoli—"this treaty awakened the conscience of Europe, and from the day it was signed the power of the Barbary Corsairs began to wane."[19]

But these are later matters, and I only mention them as the consequences which may be said to have had their origin in the extraordinary scene which took place on board the *George Washington* on October 9, 1800.

[18] *American State Papers.* Foreign Relations. Vol. II, p. 348.
[19] *The Barbary Corsairs.* Stanley Lane-Poole, pp 291-2.

RESULTANT COURSE METHOD OF COURSE ANGLE PLOTTING

By Lieutenant H. J. Hansen, U. S. Navy

Editor's Note: See Discussion page 1169 this issue. For the benefit of those readers who do not know the meanings of the symbols employed in this article, DD means destroyer, and BB means dreadnaught.

BY COMPARING the steps in plotting courses on the mooring board with the employment of the Battenburg Course Indicator for the solution of course problems, an additional, and it is believed, a less confusing method, presents itself. For want of a more descriptive name, this method has been termed "The Resultant Course Method" because the resultant movement of a ship or object from one bearing and distance to another bearing and distance, from another ship or object, is the most important factor involved. The same geometrical principles employed by the mooring board and the Battenburg instrument are utilized although applied in a slightly different manner.

The especial advantages of this more easily understood method are, that it can be worked on any sheet of paper with pencil, parallel rule, dividers, and, if there is no compass rose, a protractor, as the only necessary instruments. This is an incentive and an encouragement to "dope out" angle problems when off duty or when mooring board sheets are not available. It lends itself particularly to problems involving movements such as in navigational, tactical, or torpedo control exercises, because it can be worked directly on the plotting sheet used for navigational purposes, at the time required. Where a universal draughting machine is available over the plotting sheet, the operation is further simplified.

Preliminary to the explanation of the method, it is well to mention a few of the factors that will usually be fixed in the mind of the solver of course angle problems.

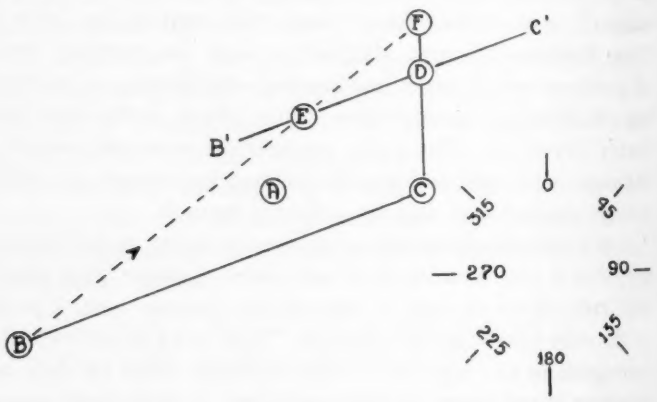
They are: 1) The course and speed of the guide; 2) Bearing and distance from guide, of own ship, or "where I am now"; 3) Assigned bearing and distance, or, "where I want to go"; and 4) As an additional, though not always essential, but a very valuable factor, it is well to remember the relation between time and distance,

expressed as speed. An easy thumb rule to remember is, that a ship moves the same number of hundreds of yards in three minutes as her speed expressed in knots. That is, a ship steaming at 16 knots is making 1,600 yards during each three-minute interval.

With these factors in mind and the instruments mentioned above or their equivalent, all mooring board problems may be readily solved. Two problems with solutions illustrated, follow.

Problem 1. Course 0, speed 10. A DD with steam for 30 knots, with guide bearing 60, distance 5,000 yards, is ordered to take position bearing 90, distance 2,500 from guide. Wanted course and time required to get into position using 30 knots.

Problem 1.



Solution. (See diagram, problem 1.) Plot guide's position A. For simple course angle problems, after A has been plotted as the reference point to begin, it is no longer required.

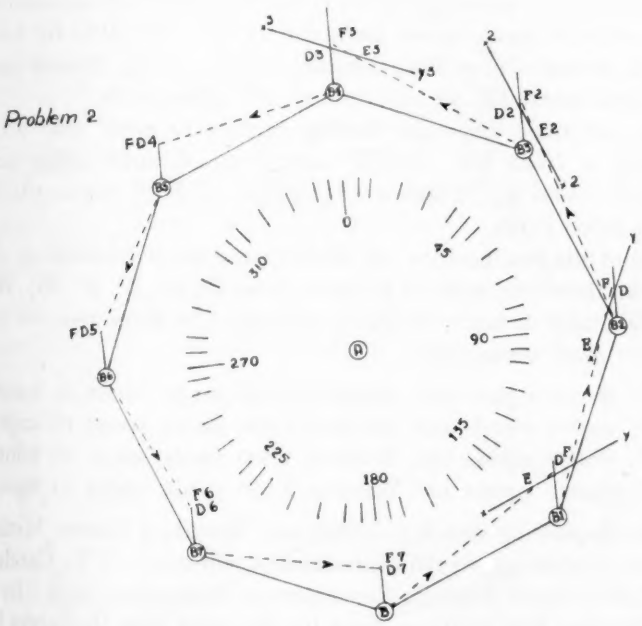
Plot B "where I am" with A on proper bearing and distance, and C, "where I want to go." Join B and C. This is the resultant course or the track which the ship makes relative to the guide, in passing to her assigned position. From C draw line representing course of guide, in this case 0.

Using any convenient scale represent on the line from C, CD speed of guide. Through D draw B′C′ parallel to resultant course. Using the same speed scale, measure DD's speed from B to (E) intersection with transferred resultant course. This is course sought, 53. Extending DD's course to F on guide's course CDF.

represents total distance DD must travel to get into position, 8,600 yards. Thirty knots is by thumb rule given 3,000 yards in three minutes or 1,000 yards in one minute. 8,600 divided by 1,000 equals 8.6 minutes to get to place assigned.

By putting in the guide's course from A and stepping off tracks of both vessels into three-minute increments, noting the time when the change of course was begun, a constant bearing and distance check can be maintained.

At each change of course, if a circle, equal to the ships normal turning circle, is inscribed in such a manner as to be tangent to



both the old and the new courses, the points touching the old and new course will mark the point the turn must be begun on the old course and the point to straighten out on the new course, and rudder will have to be put over accordingly, to avoid advance or transfer over-running the intended track.

The omission of the last two items, from the illustration of problem 1, is intentional in order that the simplicity of the method may be more fully realized.

Problem 2. A BB having been injured, is proceeding independently on course 0, speed 5, has a DD assigned as escort. The DD while approaching from directly astern, receives an order to steam in an anti-clockwise circle distant 3,000 yards, speed 25, changing course every 45 degrees of bearing from BB. Give courses followed beginning from position 3,000 yards distance, bearing 180 from BB. After arriving in position bearing 0 from BB, the DD is directed to steam for three minutes on each change of course. Give speed and courses steered in the next four sectors.

Solution. Plot A, position of BB, B starting position of DD. A's positions C become position B for the solution of each succeeding course, C positions are marked B^1B^2 etc. Plot B^1D for 5-knot speed, through D run XY, resultant course. Using 25-knot speed, find first course BE 56, and distance BF 2,600 yards.

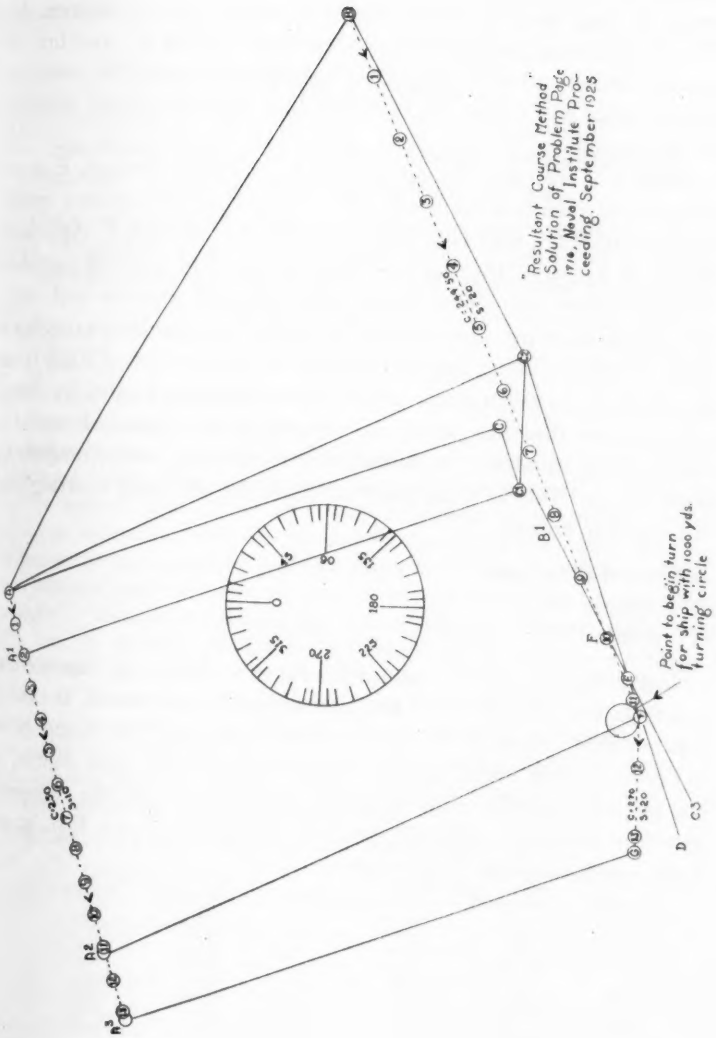
Repeat same steps for finding courses to steer until arrival bearing 0 from BB. $B^1E^1F^1$ course 19, distance 2,850 yards. $B^2E^2F^2$ course 341, distance 2,850 yards. $B^3E^3F^3$ course 304, distance 2,600 yards.

From the last position we wish to use three minutes on each course, therefore, make D positions from B^4, B^5, B^6, B^7 (B), equal to the actual distance the guide will travel in three minutes (500 yards), then connecting:

B^4F^4, course equals 260, distance 2,100 yards, speed 21 knots.
B^5F^5, course equals 198, distance 1,800 yards, speed 18 knots.
B^6F^6, course equals 152, distance 1,800 yards, speed 18 knots.
B^7F^7, course equals 100, distance 2,100 yards, speed 21 knots.

Accompanying sketch 3, applies the "Resultant Course Method" to the problem page 1716 (Lieutenant Commander T. L. Gatch, U. S. Navy) Naval Institute PROCEEDINGS, September, 1925. In this problem the first positions given for the firing ship, the target bore 300, distant 20,000 yards. Target's course 250, speed 10, had been furnished by plot. By previous understanding with the gunnery officer, it had been decided to steady on base course before arrival at the "open fire" position, at speed 20, firing ship's speed, for 4,000 yards; equaling (twice 3 minutes) 6 minutes.

Plot A, target position, bearing 300, distance 20,000 yards from firing ship. B, position of firing ship. C, "open fire" position, target bearing 70 degrees to the right of the firing course (270)


"Resultant Course Method
Solution of Problem Page
176, Naval Institute Proceeding, September 1925
Point to begin turn for ship with 1000 yds. turning circle
A1
A2
A3
B1
C1
C2
C3
D
F
S:270
S:20
S:270
S:20
C:270
S:90
C:270
S:90
0
45
90
135
180
225
270
315

distance 16,000 yards. As it has been decided to steady on base course, 4,000 yards or 6 minutes, before opening fire, target will travel in that interval 2,000 yards on course 250, to position A^1. Plot A^1C^1, firing position after 6 minutes. From C^1, run line on reverse firing course to C^2, C^2 is position to solve for resultant course from B; target bears from this position 34-30, distance 17,350 yards.

From C^2, lay off C^2E, target speed 10 knots, through E draw transferred resultant course B^1C^3. From B, using 20 knot speed, locate F on B^1C^3, and T on C^2D; connect BT through F. Approach course is 244-30. Plot target's course AA, and step off own and target's course into three minute intervals and number each step. Measuring bearing and distance between like numbers provides a constant check during the approach while the number of steps from any position to the turning or the firing point multiplied by three, will provide the time interval to reach these points. Inscribe a circle at T, equal to the ship's normal turning circle, tangent to both BT and TG, locating point to begin the turn and to straighten out on base course.

A^1C^1, and A^3G equal AC.
A^2T equals AC^2.
GT equals C^1C^2.

The difference in the approach course as found by this method 244—30, and that given in the September PROCEEDINGS, is that in this solution, distance C^1C^2 is 4,000 yards and the firing point is reached after steadying for six minutes on the base course, in the shortest possible time with the speed used. In the reference solution the base course is traveled for the distance EM, about 7,000 yards or about 10.5 minutes.

DISCUSSION

Resultant Course Method of Course Angle Plotting

(See page 1163, June, 1926, PROCEEDINGS)

COMMANDER A. M. R. ALLEN, U. S. NAVY.—The discussion in the first four paragraphs is correct and the thumb rule in paragraph four is excellent. Problem 1 is properly worked out but differs slightly from our solution.

	Lieutenant Hansen	Commander Allen
Course	53	51.5
Distance	8600 yards	8750
Time	8m.6	8m.75

This is a minor difference and may be due to many inaccuracies in the kind of paper used or in the instruments used. Attention in this connection is invited to the very noticeable inaccuracies in the mooring board form 2665b which are much greater in the distances than in the bearings.

The method used is not as readily explained as the triangle method which is ordinarily used. In the latter all problems are solved with two triangles, one static showing positions and distances usually called the "position triangle" and the other dynamic or moving usually called the "speed triangle." These triangles have one side in each which has the same direciton and all relations of distance and speed can be worked out from a fixed center using either one of the methods, drafting machine, mooring board, or Battenberg Course Indicator. Practically the same method is employed for each type of solution. The navigator is not concerned with the actual motion of either his own ship or the guide as shown by a running plot, but only with the relative motion of his own ship. It is, therefore, far more convenient to plot from a fixed center.

Problem 2 is properly done, but the results vary as noted:

Lieutenant Hansen			Commander Allen		
Course	Distance	Speed	Course	Distance	Speed
56°	2600		56°	2525	
19°	2850		18°	2775	
341°	2850		341°	2775	
304°	2600		303°	2525	
260°	2100	21.	260°	2150	21.5
198°	1800	18.	198°	1850	18.5
162	1800	18.	151°	1850	18.5
100	2100	21	100	2150	21.5

Problem 3 is worked out properly. The running plot method while excellent from the point of view of showing the exact motion of both ship and target, does not lend itself readily to keeping a check on the relative position of the ship from the target, as the position of the target must be plotted by distance run at 10 knots for each interval, making it necessary to step this off continually. The probability of error is thus increased and the

result is not worth the trouble when an accurate and satisfactory method such as the central plot method exists. The solution is therefore considered as of theoretical value, in view of the fact that practically all the operation of tracking an approach must be done from a central point. He uses the same data worked out by Lieutenant Commander Gatch in the September PROCEEDINGS but after deciding mentally to steady on the base course for 4000 yards or 6 minutes, Lieutenant Hansen does it and does it correctly and does not steady on 270° for eleven minutes.

Lieutenant Commander Gatch in his solution lays off his 4000 yards on BE when to fulfill the conditions he propounds in the beginning he should lay off 4000 yards on OA and project it on to DA transferring the distance so obtained to BE. ME will then be 4,000 yards and the course 245°. Fortunately the total time in both cases is practically the same so what he tells the captain is correct.

The proper steps for the solution of this problem by the more generally accepted methods are as follows:

1) Lay down course 270°—20 kts.
2) Lay down course 250°—10 kts.
3) Draw AD (Notation same as Lt. Comdr. Gatch's) AD = relative course and speed first leg.
4) Lay down firing point B target 340—16,000 yds.
5) Lay down present position C target 300°—20,000 yds.
6) Lay off from O, 4,000 yds. on OA. Project this distance on DA.
7) Lay off from B on course AD (107°—30') the projected distance determined in (6).
8) Draw CE and lay off same course from D to F.
9) Draw OF = course to steer on first leg, equals 245°, distance 22,500.
   Course to steer on second leg is 270°, distance 4,000.
   Relative course first leg 240°, distance 11,400.
   Relative course second leg 287°—30', distance 2,100.
   Relative speed first leg 10.1 kts.
   Relative speed second leg 11.0 kts.
10) Distance from "X" to the firing point about 20,500 actual and about 10,300 relative.
    Time to reach firing point about 31 minutes.
11) The bearing of the target at the turn to course 270° is 334°—30', distant 17,350 yards.

The comparative results for this problem are as follows:

	Relative Course and Dist. Point "X" to "open fire"											
	Lieutenant Commander Gatch				Lieutenant Hansen				Commander Allen			
1st Leg 232	7000				239–30	8200			240	8200		
2nd Leg 287–30	(4000)[1]				287–30	2100			287–30	2100		
	11000					10300				10300		
True Course and Dist. + Time.												
1st Leg 241–	14000	(20)	21		244–30	16500	25		245	16500	25	
2nd Leg 287–30	7200	11	11		287–30	4000	6		287–30	4000	6	
	21200	(31)	32			20500	31			20500	31	

[1] Lieutenant Commander Gatch laid down his actual distance 4000 yards instead of his relative distance 2100 yards.

For small turns such as required here (25°) the value of the turning circle is very small but it may be used to find out the bearing on which to commence the turn, in this case about 334° or ½° from the turning bearing. Used with the relative bearings and distances it should be an ellipse but the circle will give results sufficiently accurate for maneuvering.

It is considered that with the corrections as noted the problems presented are all good problems and that the more of this type of problem issued to the service the better, as the art of handling this important feature needs development which can only come through problems of this character.

Some Aspects of Our Air Policy

(See page 444, March, 1926, PROCEEDINGS)

CAPTAIN W. S. ANDERSON, U. S. NAVY.—Aircraft fly high but not above the law.

That is a point of Admiral Pratt's forceful and timely essay with which all naval officers will concur. And there will be great unanimity with his proposition, concurring with the President's Aircraft Board, that there shall be no separate air force now or in the immediate future.

Admiral Pratt finds that the proponents of unlimited or ruthless aircraft warfare, which he so justly condemns, come from the ranks of those who propose a separate air force. There is apparently at least one notable and disquieting exception. One highly respectable body, speaking with the authority that accrues to a government agency, appears to countenance, at least to some extent, the possibility of ruthless aircraft warfare. Perhaps it did not intend to be so understood.

The National Advisory Committee for Aeronautics was established by statute in 1915. Not only is it a government agency, but its personnel entitles it to great respect. Included in that committee are representatives of the Army and Navy, and of the scientific and engineering world. Its names include even that of Orville Wright himself.

Of course this committee, established to study the basic problems of flight, does not speak with equal authority when discussing laws of war. However, its pronouncements are bound to carry weight, as they should.

In the 1924 report of this committee is a section that appears to recognize the probability of the unlimited and ruthless use of aircraft in warfare.

Perhaps this passage was only meant as an argument that American security demanded ample aircraft resources, that therefore the industry should be fostered, and aircraft's use in warfare studied. In order that the reader may judge for himself, the passage from the 1924 Report of the National Advisory Committee for Aeronautics is quoted (Italics mine—W.S.A.):

The Increasing Importance of Aircraft in Warfare

The Limitation of Armaments Conference held in Washington in 1921-22 on invitation of President Harding examined into the possibility of limiting aviation development for war purposes and limiting the use of aircraft in

warfare. A special committee of aviation experts representing the United States, Great Britain, France, Italy, and Japan was appointed. That committee submitted a report which reviewed the situation at length. The "final conclusions" of the report follow:

"The committee is of the opinion that it is not practicable to impose any effective limitations upon the numbers or characteristics of aircraft, either commercial or military, except in a single case of lighter-than-aircraft. The committee is of the opinion that the use of aircraft in warfare should be governed by the rules of warfare as adapted to aircraft by a further conference which should be held at a later date."

"The fact that the Limitation of Armaments Conference placed no restriction on the development and application of aircraft for war purposes assures the greater relative importance of aircraft in future warfare. It is a maxim of military science that an army and a nation must be adaptable to changes in time of war. The best laid plans, whether for offensive or defensive warfare, are usually upset either by the success of the enemy or by changes and developments in the art of warfare. No one can foretell at this time what the use of aircraft will be in future wars, nor even in the next war. It is safe to say that there will be individual and group fighting in the air; there will be aircraft attacking troops on the ground, both with bombs dropped from great heights and with machine guns mounted on low-flying aircraft protected by armor from ordinary rifle bullets; *there will be bombing of large cities, military and manufacturing centers, and routes of communication and transportation. And it has been proposed that aircraft be used to drop poisonous gases not only on the enemy's troops but also behind the lines and in the centers of population, to the same extent that long-distance bombing will be carried on. The bombs carried may not be limited to explosives and poisonous gases but may possibly be loaded with germs to spread disease and pestilence. Without limitations on the uses of aircraft in warfare a nation fighting with its back to the wall can not be expected to omit to use desperate means to stave off defeat. The uses of aircraft in warfare would then be limited only by the inability of human ingenuity to conceive further uses for this new agency of destruction.*

"A conference was held at The Hague in 1923, attended by delegates of the United States, which drafted rules and regulations covering the use of aircraft in war. There was evident a tendency to minimize as much as possible aircraft attack upon centers of population with the resulting consequences to non-combatants and to restrict such attacks to what are military objectives. *In spite of the rules thus formulated, and even if they should be universally adopted, it is still inevitable that aircraft attacks would greatly terrify and undoubtedly seriously injure and damage many who have heretofore been classed as non-combatants.*

"It is believed quite probable that if the nations of the world do maintain adequate air forces, this may tend to the adjustment of international disagreements by conference, as the delegates to such conferences will have the strong backing of their national air forces *capable of such destructive effect as that indicated above.* When wars were fought within a limited territory by ground troops, the national patriotism of non-combatants strongly supported their armed forces, but *in future wars when air power becomes a most vital factor in national defense, theaters of operation will no longer be limited to restricted territories, and noncombatants will probably and unavoidably be subjected to far greater personal danger and injury than in the past.* It is not inconceivable that such pressure will be brought to bear upon the governments concerned by their noncombatants, following a series of aircraft raids, that an early cessation of hostilities will be more earnestly desired by the people on both sides and will be forced by popular demand upon the nation least efficient in air power.

"Aviation has made itself indispensable to military and naval operations. Under our present organization, where the function of national defense is vested principally in the War and Navy Departments, we must look to those departments to develop the possibilities of aviation in warfare, whether to be used in conjunction with military and naval operations, or to be used independently for attacking distant points behind the enemy's lines, or elsewhere. The problem of the air defense of this country is worthy of most careful study."

That ends the quotation.

It is true that the Washington Conference did not place any limitation upon the use of aircraft in warfare. But did that annul the fact that aircraft were already bound by the limitations of the laws of war, which already, both by custom and written treaty bound the armies and navies of the civilized nations of the world? Are not aircraft parts of those armies and navies, whatever fighting aircraft may be called? It is submitted that the Arms Conference Committee did not question that aircraft were so bound, but that they reaffirmed it. At the same time they recommended that the laws of war should be restated in terms specially adapted for the guidance of those employing aircraft in warfare.

That committee, in its "final conclusions," made two distinct statements. The first was that it was impracticable to limit either the number or characteristics of heavier-than-aircraft. The second was that "aircraft in warfare *should be governed by the rules of warfare* (Italics mine. W.S.A.) as adapted to aircraft by a further conference," which has been held. It is possible that a confusion of ideas has crept in here. Apparently the second statement has been obscured by the first. The committee did not state that it was impracticable to limit the operations of aircraft, but stated the contrary. A confusion of these statements may be responsible for a degree of mistaken acquiescence in the idea that for some mysterious reason aircraft are beyond the laws of war.

The Aeronautics Committee's report states that there will be bombing of large cities, of manufacturing centers, and of routes of communication and transportation. This is apparently regardless of whether these areas may or may not be legitimate military objectives as we now know the laws of war, which forbid bombardment of undefended towns, and the slaughter of noncombatants.

We find mention of the proposition, for which the committee does not assume responsibility, but apparently dignifies it as a possibility that must be accepted, that aircraft will drop poisonous gases and germ-laden bombs upon the hapless populations. This we find notwithstanding that a Washington Conference Treaty now ratified by the United States specifically declares that the use of poison gas is forbidden by international law.

Even after considering the report of the Hague conference of 1923 to adapt to aircraft the laws of war, and noting that this conference resulted in proposed rules to limit aircraft activities to military objectives, the Aero-

nautics Committee continues to apprehend unlimited use of aircraft in warfare. It is difficult to see justification for the committee's statement that, "when air power becomes a most vital factor in national defense, theaters of operation will no longer be limited to *restricted territories* (Italics mine. W.S.A.), and noncombatants will probably and unavoidably be subjected to far greater personal danger than in the past." Does "restricted territories" mean military objectives as we now know them under the laws of war? Does it mean that such limitations will not be recognized by aircraft because they can fly to other places? Surface craft can go to other places than those they are legally justified in bombarding. So can ground armies with artillery.

Reduced to its ultimate terms, the part of the Aeronautics Committee's report quoted, seems to state that aircraft may carry on warfare in a ruthless and unlimited way, whether or not there are international rules of warfare outlawing such procedure. If we concur in that then no treaty can be relied upon. The recent treaties are no more a protection than were others that passed into the discard during the World War.

It cannot be possible that mankind as a whole has become absolutely faithless. The World War proved otherwise. But the World War did prove that one recreant nation could appear in the clash of war and violate the laws of war and of common humanity. Perhaps it was this fact that the Aeronautics Committee had in mind. Perhaps it merely voiced a warning based upon this unfortunate experience of the World War. Perhaps it did not mean to imply approval of the ruthless warfare by aircraft *that it predicted.*

If no approval was intended, a clear statement to that effect should be made. At this time, when so much has recently been said on the subject of aircraft, there should be clarity and unanimity of authorized statement as to our national aircraft policy. It is true that much has recently been done in that direction. But the idea of ruthless warfare, by aircraft, or by any means, is repugnant to the united conscience of the world. It is not the policy of the United States. No dubious authorized statement should be left in existence that may sometime return, perhaps in the welter of war, to confound us.

But so far as the warning of the committee has force, it is general in application. It does not apply to aircraft alone. An enemy who would wage war with aircraft in violation of the laws of war would wage it with any arm with similar disregard.

If in spite of the laws of war, national security demands that a country be so well supplied with aircraft that it can protect itself against ruthless aircraft attack, national security demands equally a similar generous provision of sea craft.

The Cruiser

(See page 607, April, 1926, PROCEEDINGS)

LIEUTENANT H. J. WRIGHT, U. S. NAVY.—Lieutenant Webster, in his excellent analysis of cruiser characteristics, has minimized the importance of the battle rôles of the type and has classified these rôles as "auxiliary functions." Among the functions so classified are "(j) scouting . . . . (k) beating off enemy destroyers . . . . (l) support of own destroyers." He also says of scouting "This is the sole legitimate duty in direct connection with the battle fleet that the larger cruisers should be called upon to perform."

Without any desire to be hypocritical it seems to the writer that the battle rôle of the cruiser cannot be so lightly dismissed. Lieutenant Webster quite rightly states that the enemy fleet must be destroyed or contained before control of the sea is assured us and the cruiser enabled to fulfill its *raison d'être*. The destruction or containing of the enemy fleet is then vital to the control of the sea. Any type which plays an important part in this "consummation devoutly to be wished" must of necessity have attached to its battle rôle an importance which must be characterized as "vital," for all the numerous benefits that accrue to a belligerent who exercises control of the sea flow directly from the decisive fleet action.

The important and varied duties of the light forces in battle need no exposition here. Suffice it to say that the skillful disposition and coordination of the light forces, prior to joining the main action, is the most potent and fruitful means a commander-in-chief has at hand to obtain superiority at the point of contact, to guard against surprise and to negative the superiority in gunpowder an enemy may possess.

Some authorities hold that the primary battle mission of the cruiser is to support the destroyers and the light mine layers in their attack on the enemy battle line or fast wing and to defend our battle line and detached wing against attacks by enemy light forces. Lieutenant Webster deems it "highly wasteful of material to build cruisers to support destroyers or beat off their attack" as, he says "this is destroyer work." *It is just this conception of destroyer work in battle which has been chiefly instrumental in frustrating every destroyer attack ever launched in battle without cruiser support.* And conversely, the supported attack has met with astonishing success. In the first phase of Jutland, the battle cruiser action, both Beatty and Hipper launched unsupported destroyer attacks. The British Thirteenth Flotilla advanced to attack and seeing the German Ninth Flotilla ready to counter attack, turned to intercept them. The usual mêlée between the lines resulted with no material or tactical advantage to either side, both lost destroyers, and neither got in an effective torpedo attack. At 7:25 P.M. Scheer, being perfectly T'd by the British fleet and being in desperate straits, ordered his destroyers to attack supported by battle cruisers and went through his justly celebrated "turn-about" to extricate himself from his untenable position. The British turned away and Scheer disappeared

into the mist. Eleven destroyers supported by five battered but gallant cruisers dismissed the most powerful fleet of dreadnaughts ever assembled in battle.

It is not the destroyer attack squadrons' mission in battle to fight destroyer duels between the lines—it is to gain a favorable position for launching torpedoes at the enemy and such positions must be fought for—they are not presented to us by an alert enemy. The cruiser must do the fighting for the destroyers and must turn back the enemy destroyers else our destroyers will never get to their firing point. Likewise must they support our light mine layers in battle. How are they to lay their mines unless the enemy cruisers have been fought off? Certainly we shall never engage an enemy so complacent as to allow us to place a mine field across his advance unmolested. We may be absolutely at rest on this point—that whether or not we employ cruisers in the fleet battle, the enemy will not forego the use of this vital type. It seems to the writer that the battle rôle of the cruiser is a primary function rather than an "auxiliary" one.

Lieutenant Webster has pointed out one glaring inconsistency in the ideas of cruiser armament which has apparently been somewhat of a fetish in our cruiser construction. He says "The torpedo has no place on the present overcrowded cruiser." There is no probable employment of the cruiser today which can be made to justify the waste of valuable space allotted to torpedoes and mines in our present cruisers. An analysis of all the probable employments of the cruiser indicates that the weapon essential to the fulfillment of her various missions is the gun and every ton allotted to torpedoes and mines serves only to dissipate the cruiser's effectiveness. It is to be hoped that CLs 24-31 will be proper cruisers in this respect instead of ships which are neither cruiser, destroyer, nor mine layer but combinations of these three types which of necessity will be inadequate to perform any one of the duties of these quite distinct types.

National Policy and Naval Power

(See page 229, February, 1926, PROCEEDINGS)

OUR INFANT NAVY

The Herald-Star, Steubenville, Ohio, 7 April, 1926.—The magazine record of Naval Institute proceedings for February contains a review of this branch of National Defense by Captain[1] William H. Gardiner, which is well worthy of careful consideration. Much of the review is of a technical nature, but that need not deter the average citizen from appreciating the suggestions offered. For instance, a whole volume of information is paraphrased in the following summary:

Although the land and population of the United States are only about six per cent of those of the world, we produce nearly half the world's consumption of coal and between half and three-quarters of its iron and steel,

[1] EDITOR'S NOTE: The Editor believes the term "captain" to be erroneously applied to Mr. Gardiner.

petroleum, copper, lead, zinc, timber, etc., as well as much of its machinery and other manufactures. This has led many to look upon our country, together with its neighbors to the north and south, as a self-sufficient continent. But this point of view overlooks the dependence of our home industries upon imports of such necessities as rubber, jute, tin, and manganese. In the telephone on every desk are materials from sixteen countries. The United States is today a food importing nation measured in dollars—that is, we import more sugar, tea, coffee, spices, nuts, and tropical fruits than we export of wheat and meat. Nor should it be forgotten that we have to import from overseas more than two dozen kinds of foreign materials essential for the conduct of modern warfare. So our security in war as well as our standard of living in peace time is dependent on the reliability of our means of overseas communication.

Passing over discussion of the so-called Monroe Doctrine, Open Door, and control of our transportation facilities overseas, and also the debatable questions relating to different arms of the service, we come down directly to the question of sea power. The conclusion is reached that gauging our ships by those of England and Japan our battle fleet is so deficient that there are grave doubts as to its ability to proceed with reasonable safety to Manila or to any remote base in time of war. Captain Gardiner charges this condition to the course pursued by Congress in cutting the naval appropriation down from $400,000,000 a year to about $300,000,000, although expert authorities have insisted that $100,000,000 more a year must be spent if our Navy is to be brought up to the treaty ratio and kept there. Captain Gardiner somewhat sarcastically concludes:

> It is easy to decry so-called militarism and to flout professional opinion, as Wilson did. Then the result was that our interests were outraged and we were forced to fight, though comparatively unprepared, whereas adequate preparedness against the event of war surely would have given such weight to our diplomacy that our interests would have been respected and our peace policy accepted without the appalling waste of our actual participation in the war.

Colonel House himself could not have summed up that situation more tersely.

Ships That Are No More

(See page 464, March, 1926, PROCEEDINGS)

LIEUTENANT (j.g.) W. S. WHARTON, U. S. NAVAL RESERVE.—In "Ships That are No More," published in the March, 1926, issue of the Naval Institute PROCEEDINGS, the statement was made that the battleship *Iowa* was the first ship of the Navy to bear that name.

Since publication, Mr. H. C. Palmer, an associate member of the Institute, has called attention to the fact that another ship bore the name.

Mr. Palmer states: "All that I know at present is that in the appendix of J. R. Soley's book, *The Blockade in the Cruisers*, there is a list of vessels projected during the Civil War. Among them was the *Ammonoosuc*, a vessel that was designed to carry seventeen guns and to have a displacement of 3,213 tons. This vessel was in the same class as the *Wampamoag*. It is first mentioned in the Navy Register for the year 1864, when it was noted

that the ship *was* building at the Navy Yard at Boston. The same notation appears for 1865 and 1866, but in 1867 it is noted that the ship was finished at New York. In 1869 the ship is listed as receiving engines at New York. In 1869 it is noted laid up at Boston Navy Yard. In 1870 the name of the ship was changed to *Iowa* and she continued to be reported in the Navy Register up to 1882 as laid up at Boston Navy Yard."

Limitation of Naval Armament

(See page 427, March, 1926, PROCEEDINGS)

RICHARD V. OULAHAN, *New York Times* of 11 May, 1926.—Recently Brittish writers have shown irritation over an understanding that naval opinion in the United States held that the 5-5-3 ratio should be maintained in classes of warcraft other than battleships and aircraft carriers. This is called the "one power standard." They maintain that nothing in the Washington Naval Treaty justifies any such view.

On March 18 Mr. Bridgeman, First Lord of the Admiralty, said at a banquet in London:

"There is always a little danger in talking about the one-power standard. That only exists in regard to battleships and ships of large size. It would be a very dangerous thing for this country (Great Britain) to allow it to be thought that we could be satisfied with a one-power standard in cruisers, for example.

"In cruisers we want to feel that we are, at any rate, superior to other countries and are able to protect our trade."

A critical analysis of the Washington Naval Treaty by Captain Walter S. Anderson, U. S. N., which won first honorable mention in the United States Naval Institute prize essay competition this year, gives an inkling of American naval dissatisfaction with the treaty. Captain Anderson charges that the treaty in uneconomical, unfair, sacrifices America's defense of its territories, trade and interests in the Far East, and is not only contrary to the present security and interest of the United States, but disregards the interests of posterity.

Captain Anderson stresses the view which British critics resent, that the 5-5-3 ratio of naval strength should be applied by the United States, Great Britain and Japan to warcraft other than capital ships. Of the treaty-cruiser situation, he says:

"The United States is conspicuously short in number of light cruisers. Now if the United States did establish a principle by sacrificing so many heavy ships it was that the nation with most vessels of a type should reduce to the prescribed ratio by scrapping vessels. Even upon the basis of the 5-5-3 ratio this would require Great Britain to scrap thirty-nine light cruisers and Japan to scrap seventeen.

"Will they do it? By their actions the world will learn their frank opinion of the sacrifices the United States made. For the first time in history a nation voluntarily renounced naval superiority."

But the cruiser competition, in which America is a laggard, is only one feature of American interest in naval disarmament. Great Britain, for example, wants submarines abolished. She would be willing, too, to abolish battleships. France and Italy, indifferent in battleship construction, strongly oppose submarine abolition. Our attitude toward submarines does not contemplate abolition, but it might.

Then there are questions of aircraft and poison gas.

The Washington Naval Treaty provides that it shall remain in force until Dec. 31, 1936. But it provides, also, that the United States, "as soon as possible after the expiration of eight years from the coming into force of the present treaty," shall arrange an international conference to consider what changes in it are necessary to meet "possible technical and scientific developments."

The eight years will expire Aug. 17, 1931. President Coolidge would like to call the revisionary conference long before that.

There is talk already of modifying the treaty provision and forbidding the construction of battle cruisers, those powerful, fast superdreadnoughts which sent von Spee's German squadron to destruction off the Falkland Islands.

The United States has no battle cruisers. Britain and Japan have four each. We were building two at the time of the Washington conference and agreed to convert them into aircraft carriers.

A Destroyer Leader for the United States Fleet

(See page 1111, June, 1926, PROCEEDINGS)

London Times, 27 April, 1926.—New Flotilla Leader.—Professionally, perhaps the greatest interest will be taken at Malta in the flotilla leader *Tigre*, not only because the vessel has only just been completed, but also because she is of similar name and type to a vessel in the Italian force present last week. The Italian *Tigere*, begun in 1921, is of 2,165 tons, 50,000 horse-power, 35 knots speed, and carries eight 4.7-inch and two 3-inch guns and six torpedo tubes. The French *Tigere*, begun in 1923, is of 2,359 tons, 50,000 horse-power, 35½ knots speed, and carries five 5.1-inch and two 2.9-inch guns and six tubes. The French vessel is the heaviest flotilla leader listed in the British official return of fleets, but not the fastest, as the seven vessels of the "Scott" class in the British Navy, completed in 1918-19, were designed for 36½ knots. These mount five 4.7-inch guns, or three less than the number of guns of the same caliber mounted in the Italian *Tigere*. The French type, apparently, has an advantage over both British and Italian in fuel capacity, provision being made for a maximum stowage of 540 tons of oil fuel, as against 500 in the British and 400 in the Italian designs.

575 LB. PRESSURE YARROW MARINE BOILER

From The Engineer

PROFESSIONAL NOTES

PREPARED BY

LIEUTENANT COMMANDER H. W. UNDERWOOD, U. S. NAVY

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575 LB. PRESSURE YARROW MARINE BOILER
From The Engineer

GREAT BRITAIN

Naval Construction

The Engineer, 16 April—Now that two battleships, five cruisers, and several smaller craft—all of the latest design—are completing afloat, while other fighting ships of various types are on the stocks or about to be laid down, the reconstruction of the British Navy on post-war principles may be said to have fairly begun. From a survey of the new material in hand it is evident that no revolutionary changes in the organization of the fleet are contemplated. Capital ships still form the backbone of the force, and cruisers retain their traditional value, both as fleet satellites and as guardians of trade. It is true that the new vessels of every class are larger, swifter, and more powerful than their predecessors, but they have obviously been designed for the same functions, strategic and tactical. This can only mean that, in the judgment of our highest professional authorities, the methods of naval warfare remain fundamentally unaltered, notwithstanding the intervention of submarines and aircraft. That view is not peculiar to the British Admiralty; it is shared with equal conviction by the naval experts of the United States and Japan, which countries are developing their fleets on very similar lines. For example, the United States is reconstructing six battleships at heavy cost, and intends to modernize seven more in the near future, while Japan is spending a great deal of money on improvements to her ten capital ships. Thanks to the Washington Treaty, no further vessels of this type may be built before 1931, but it is well known that tentative plans for new battleships and battle-cruisers are being drafted abroad. For the moment, however, interest is centered chiefly in cruiser design, cruisers being outside the numerical restriction which the Treaty imposes on capital units. According to the official "Return of Fleets" for the current year, forty-seven cruisers are under construction or about to be laid down for the seven leading powers, and thirty-five of them belong to the 10,000-ton "Treaty" class. The British Empire heads the list with thirteen ships of 10,000 tons and one of 8000 tons. The United States has ordered two 10,000-ton cruisers and authorized six more. Japan has four 7100-ton and the like number of 10,000-ton ships in hand. France is completing the three 8000-ton *Duguay-Trouins*, is building three 10,000-ton *Duquesnes*, and will shortly open credits for the construction of three additional ships. The Italian program includes five 10,000-ton cruisers, of which the *Trento* and the *Trieste* are on the stocks. Russia is making slow progress with the 7600-ton *Butakoy* and *Lazarev* of pre-war design; and Germany, having completed the new 6000-ton *Emden*, is preparing to build three further vessels of that series.

Following the order of precedence established by the "Return," we come to cruiser-minelayers, of which the *Adventure* is the sole British representative. This vessel, which was launched two years ago, has a displacement of 6740 tons, a speed of 27¾ knots, and an armament of four 4.7 inch guns. She will, presumably, carry a large number of mines. It is to be hoped that the £1,500,000 spent on the *Adventure* will prove a good investment, but we are not very sanguine about it. Here is a ship of relatively large displacement and high cost, yet of mediocre speed and with an armament inferior to that of the latest flotilla leaders. She would be too slow to escape from a smaller but more heavily armed opponent, and if brought to action would fight under a grave disadvantage. Since war experience is held to have demonstrated the importance of high speed in mine-laying ships, we are at a loss to comprehend the reasons which led to the building of the *Adventure*. She may, of course, embody improvements in machinery, etc., which justify her formidable cost, but so long as the Admiralty's ban on details of new construction is rigidly enforced, it is scarcely permissable even to speculate on the secrets of her design, if any. A cruiser-minelayer of 4000 tons is being built for the French Navy, but no further particulars

are available. Of the eight aircraft carriers we possess, all save the *Hermes* are converted ships, three having been originally designed as light battle cruisers, one as a battleship and the other three as merchant vessels. They range in size from the *Pegasus*, of 3070 tons, to the *Eagle*, of 22,600 tons. Probably the most useful members of the group are the *Furious*, *Courageous*, and *Glorious*, which can steam at 31 knots and have a large carrying capacity. Aircraft carrier design represents one of the most perplexing problems of naval construction at the present time. There are grave objections to such mammoth vessels as the U. S. *Lexington* and *Saratoga*, of 33,000 tons. Apart from their staggering cost, estimated at £9,000,000 per ship, they offer too vulnerable a target to every form of attack. The loss of one of these ships, with its complement of seventy-two airplanes and its vast stores of accessories and munitions, would be a crushing disaster. The Japanese *Akagi* and *Kaga*, of 27,000 tons are open to the same criticism. The design of future carriers will necessarily be influenced by the technical progress of the airplane itself, and even more by the improvement of devices for checking the velocity of machines about to land on deck. It is understood that very successful landing operations have taken place on board the Hermes, which has a displacement of only 10,550 tons. For British naval requirements, three ships of the *Hermes* class would be preferable to one gigantic vessel like the U. S. *Lexington*. No flotilla leaders are under construction or projected in this country, but France is adding many of these vessels to her fleet. Her latest leaders are ships of 2700 tons, with a speed of 36 knots, and six 5.1 inch guns. It is not easy to define the *métier* of such craft. They are far too large for torpedo work proper, and needlessly powerful for any of the duties that ordinarily devolve upon flotilla units. We notice, also, that the displacement of the new Japanese destroyers is to be 1800 tons. Our latest destroyers, *Amazon* and *Ambuscade*, are of 1330 and 1210 tons respectively, but as these weights do not include fuel or reserve feed water, the actual displacements will be substantially larger. Is it not time that the whole question of destroyer design was reviewed in the light of practical experience? As torpedo carriers, these vessels signally failed to justify their existence during the war. To the best of our knowledge only three major ships were hit by torpedoes fired from destroyers, *i.e.* H. M. S. *Goliath* in the Dardanelles and H. M. S. *Marlborough* and the German *Pommern* at Jutland. In the latter engagement some two hundred destroyers took part, and many were sunk, but except that the threat of torpedo attack caused the grand fleet to turn away shortly after deployment, the direct influence of destroyer movements on the course and issue of the battle was almost negligible. Their most valuable service consisted in putting up smoke screens, a duty that could have been performed equally well by boats of much smaller tonnage. It seems to us that the destroyer has outlived its utility as an instrument of torpedo warfare, and should henceforth be regarded primarily as an anti-submarine unit. If this premise be granted, it follows logically that the general design of the type stands in need of modification. The displacement might be cut down to 1000 tons or even less, the gun armament retained or strengthened, the torpedo tubes reduced in number or abolished, and the depth-charge equipment increased. The sole justification for large dimensions in vessels of this type is seaworthiness. We believe, however, that a boat of 1000 tons, relieved of the superfluous tophamper with which our present destroyers are burdened, would make better weather of it in a seaway than an overloaded vessel of twice the weight. Merely because other governments see fit to build so-called torpedo craft of exaggerated size is no reason why we should follow slavishly in their wake.

We should welcome the exhibition of a little more originality on the part of the authorities responsible for the design of our new fighting ships. Un-

fortunately, the present Board of Admiralty, by choosing to make a profound mystery of everything pertaining to new construction, has rendered both criticism and suggestion equally beside the mark. Much as we would like, in the national interest, to believe that the Royal Corps of Naval Constructors enjoyed an absolute monopoly of experience and skill in the designing of men-of-war, we must regretfully confess to being skeptical on this point. Under existing conditions, however, every new ship ordered for the navy is planned, built, and completed without any opportunity being afforded for even a superficial examination of the broad features of the design. This might, perhaps, be a defensible policy if we were surrounded by jealous rivals, eager to filch our secrets and over-trump our latest designs, but that is hardly the case at present. The love of secrecy for its own sake is a bureaucratic vice alien to the national temperament, and one which we hope will never be permitted to take root here. We venture to remind the Admiralty that the maintenance of our sea power depends ultimately on the degree of interest which the nation as a whole can be induced to take in the navy. There are, however, unmistakable signs that public interest in naval affairs is waning, a phenomenon which may be ascribed, in part at least, to the excessive official reticence which has been practiced since the war.

The Present Outlook for British Shipbuilding

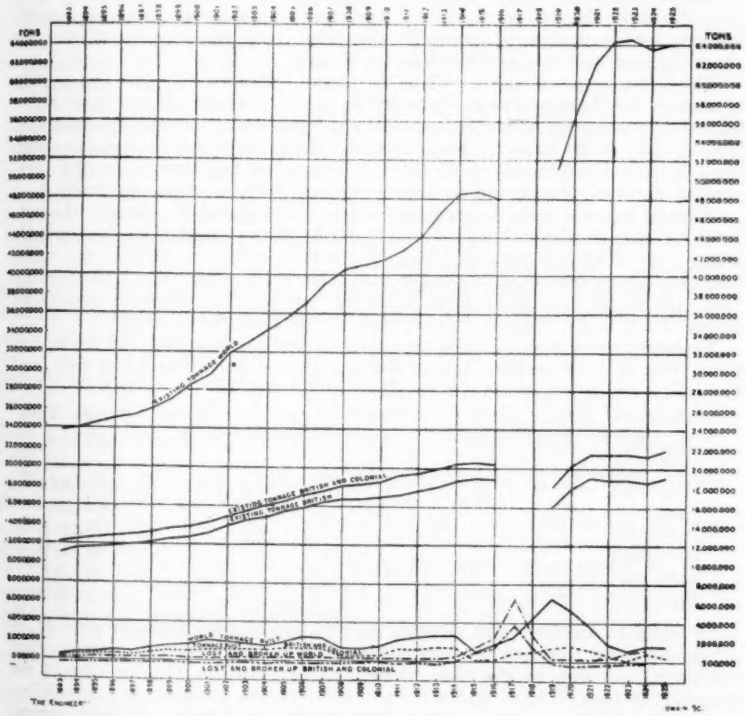
By A. C. F. Henderson, *The Engineer*, 26 March.—It may be said that the subject of this paper is somewhat redundant, in view of the recent inquiry into the conditions in the shipbuilding trade, from which we all hope much good may result, but with this view I venture to disagree. In the first place, it seems to me that the shipbuilding trade cannot be considered alone, as its past, present, and future is so bound up with the kindred industry of shipowning that it would be a good thing if the whole subject could be considered and discussed from all sides. Whilst on this subject, although I do not want to broach anything of a controversial nature, may I be allowed to say, purely as a very amateur shipbuilder, but as also representing the owners, that I feel sure it would be of mutual advantage in the future if both industries considered and discussed together the matters coming under the purview of this institution, more in collaboration than has been the case in the past.

In trying to make any estimate of what is likely to happen in the future, of the likely course that events will take, it is necessary to study what has gone before, and before going any farther I should like to call your attention to some very interesting facts revealed by the accompanying diagram.

The first thing that strikes one on looking at it is the position that Britain and her Dominions occupy, and have occupied, in the world's tonnage position. In the year 1893 their total was 12,788,282 out of a total of 24,236,865, or 52.76 per cent. This position, with slight variations, continued until the year 1900, but from that date our premier position began to decline, although our percentage remained fairly constant until 1912, when the world's tonnage grew a great deal faster proportionately than British and Dominion tonnage. The growth all along has really been in the British figures, as Dominion tonnage only increased by 50,000 tons during nineteen years. At the end of the war we had actually 2,400,000 tons less than in 1914, although the world's tonnage had grown in the period by nearly 2,000,000 tons. Since 1919 we have made up the deficiency and now possess more tonnage than we have ever had, but owing to the large fleets built by the United States and other nations, our percentage of the world's total has fallen considerably. There is reason to hope, however, that a great many ships built during the war will, when scrapped, never be replaced, and that this country's proportion will thereby benefit. This is borne out by the fact that whilst the

world's tonnage last year was less than in 1923, the British tonnage increased.

As regards the figures for tonnage lost by casualty and broken up, the one fact that stands out is the very slight variation that has taken place during the period in question, either in the world's or British figures. This is even true during the period of the war, if we exclude the figures of purely war losses. There are, however, two periods of exception to this regularity—namely, during 1909-11 and the last four years—both brought about by the economic necessity of the day. This, I think, is an encouraging sign, both from a shipbuilder's and shipowner's point of view, and you will notice that in the year 1923 the tonnage lost and destroyed exceeded that built by



over 700,000 tons, and in the following year the tonnage built was only in excess by the small margin of 390,000 tons.

The curve for tonnage built is perhaps the most interesting of all, and illustrates very graphically that whilst the world's population, and in consequence its trade, goes on increasing decade after decade, the tonnage built does not generally follow the same curve, but varies according to limited periods of years within fairly narrow limits. This would seem to show that shipping, unlike other forms of the utilization of capital, is more of an opportunist trade, not anticipating an increase, and that generally, except in very exceptional times, there is a large volume of tonnage in excess of the world's demand.

The period that I have taken in my paper covers several distinct phases, but I am not alluding to the war period, except in its effect, as that was

distinctly abnormal. The first six years, 1893-1898, were distinctly ordinary, but the next five were moderately good with the year 1901 reaching a peak. The following year saw a slight drop, but the next three years were good years. We then entered a very dull three years, and it was not until the year 1911 that shipbuilding really became active again, and in that year and the three following the tonnage launched was never exceeded until the war and the after-war periods. The latter periods need, of course, no explanation, but what is interesting to note is that the high rate of building by the world was protracted long after the war, and it was not until the year 1922 that the amount became more or less a pre-war normal figure.

The British figures followed very closely the world's figures which I have quoted, except that an increase began in 1908, a year earlier than the world's figures, whilst the world's drop in the year 1904 was protracted over the previous year also in the case of Great Britain.

The percentage of building done by Great Britain as against the world's total has also been a gradually reducing figure, coming down from above 80 per cent to nearly 50 per cent, except during the war, which was abnormal. This is only to be expected on account of the natural desire of other countries to build for themselves. I think, however, we can look forward to preserving the total percentage we now build, and perhaps even increasing it.

Now as regards what is really the subject of this paper—namely, the outlook for British shipbuilding—I must confess that I speak with considerable amount of diffidence, realizing as I do that the *rôle* of a prophet has never been a popular one. On the other hand, we start, with things as they are today, from the best possible basis for our purpose, as whatever figures we arrive at are more likely to be exceeded, rather than the reverse.

To secure some sort of basis on which to work, I have divided the figures since 1893 into the periods, taking the figures for British building only, and the following averages are the result:

Period	Average Tons
1893-1897	989,219
1898-1902	1,435,825
1903-1904	1,197,890
1905-1907	1,686,467
1908-1909	960,364
1910-1914	1,660,246
1920-1925	1,299,154
1921-1925	1,147,860

In order to try to arrive at some sort of figure which would seem to be a near estimate of what we may expect in the near future, I have worked out the calculations on the basis of each of two periods. In the case of the period 1908-1909, I have added 10 per cent, as the addition to shipbuilding figures due to better trade, and in this connection I think an improvement in trade will be more quickly reflected in the figures in the near future than has been the case in the past. I have also added 111,481 tons as representing the difference between the average shipbuilding done for foreign countries in the last two years, and a more normal total of 250,000 tons. In the case of the years 1921-25, I have first of all deducted 150,000 tons before making the other additions. This figure represents, in my opinion, a very fair estimate of the excess of normal building owing to the rapid replacement by liner companies due to war losses, and the consequent increase over what may be termed normal figures. In addition to this, the same calculations as in the previous period have been made.

The results of the two calculations are as follows:

	Tons
Period 1908-1909	1,167,881
Period 1921-1925	1,209,127

This is perhaps not a very satisfactory result from the British shipbuilders' point of view, but if we take an average of the two periods, namely, 1,188,504 tons, it does represent a slight advance over last year, and not the reverse, as many of us might have expected.

I have said before that prophecy, or rather the attempt to prophesy, is not a satisfactory business, and I again repeat that. At the same time, let us remember the following facts:

1) That we are starting from the very worst basis from a trade point of view, and that therefore all indications are that the trend of the curve will be upwards.

2) That British invention and initiative are never so keen as when they are up against a very serious position.

3) That a large amount of tonnage at present in existence is now useless without large expenses, and in a few years' time will in any case be useless.

4) That there are distinct signs of a trade revival, especially in passenger business, and although this may be slow in the shipowning trade, it will have its effect on the shipbuilding business.

5) That we still have as good, if not the best, operatives as any in the world in shipbuilding, and given some revival in the industry, a new generation of workers will grow up in the industry, for whom the incentive does not at present exist.

Taking all the above facts into consideration, I think we can confidently look forward to something in the neighborhood of 1,200,000 tons for British shipbuilding construction in the current year, and perhaps its eventual improvement next year.

India's Progress Surprises Britain

Wall Street Journal, 12 April.—During the week, Lord Irwin sailed from London for India, to take the place of Lord Reading as Viceroy of India.

This change of viceroys has called the attention of Great Britain to the amazing prosperity and industrial efficiency of India.

Apparently, next to Canada, India is now the most prosperous and progressive country in the British Empire.

Her mills and factories are running on full time. Her budget has been balanced. Her experts have increased 75 per cent in four years. And her markets are thronged with buyers.

India has had four good crops in succession. This rarely happens. It means much to India, as 72 per cent of the people of India are farmers.

The fact is that India has entered upon a new era of industrialism and financial independence.

India has not borrowed a dollar in the London money market since May, 1923.

Her joint-stock and exchange banks have now deposits of $385,000,000; and her new Imperial Bank of India has been organized, with 100 branches.

There are now 56,000 cooperative societies in India, with a capital of $125,000,000. All of these have been organized since 1921.

Exports Exceed Imports by $650,000,000

England has never realized until recently the strength of India's trade position. It is now known, to the surprise of the English people that India's imports are only $850,000,000 a year, while her exports are $1,500,000,000.

India is now selling Japan and Continental Europe three times as much as she buys; and she is selling America twice as much as she buys from America.

A distinguished Hindu recently amazed a London audience by observing that the seaborne trade of India is now one-fourth as large as the seaborne trade of the British Isles.

India is Britain's best customer. The United States is second, Germany third, Australia fourth. India buys three times as much from Britain as Canada does.

There are now about 1,000 joint-stock companies in India, with a paid-up capital of $850,000,000.

There are 15,606 mills and factories, with 2,681,000 workers. All told, there are 33,000,000 people supported by the new industrialism of India.

In 1925, the mineral output of India rose to the value of $140,000,000. There was gold to the value of $10,000,000. There was $35,000,000 worth of petroleum and $50,000,000 worth of coal.

Has Insatiable Demand for Gold

There was a tea crop of 360,000,000 pounds, sold at high prices. The tea planters of India have become very efficient. They levy a tax upon themselves and spend it on advertising and better salesmanship. Already they have greatly increased the use of tea in the United States.

India has iron and steel mills, too, and has been helping them by the gift of heavy subsidies.

India's policy is to develop her own manufactures. A low tariff is now in force on foreign goods; and the general belief is that India will very soon adopt a policy of protection high enough to shelter her 15,000 factories

India has announced her desire to adopt the gold standard, but this announcement has not been favorably received in England.

"If India adopts the gold standard," says *The Banker*, "the rest of the world may be forced to abandon it."

India has always been insatiable in her demand for gold. Last year she imported gold to the amount of $300,000,000.

India is a sink-hole for gold. The gold that goes in, never comes out. It is hoarded or used for purposes of decoration.

Financially Independent of England

In population India is 75 per cent of the British Empire. In area it is more than half as large as the United States and thronged with 320,000,000 people.

Three families out of four live on the land and have very low standards of comfort. They till the land with the crudest of hand-tools.

They wear the cheapest of gray cotton cloth, which is now made in India or bought from Japan.

An effort is now being made to introduce improved methods of farming among India's 50,000,000 farmers.

The new viceroy—Lord Irwin, was minister of Agriculture in the British government. He belongs to one of the old land-owning families of England; and he will give especial attention to the improvement of agriculture.

The spirit of sedition has now almost died out in India. The anti-British feeling has subsided.

The British have ruled India for about 170 years, and on the whole they have made a good job of it.

There is now a larger measure of freedom and self-government in India than ever existed in the pre-British days. And the latest figures from India show that it is no longer a financial dependency of England.

The last Lord Dufferin used to compare India to an old kettle that was always in need of patching. "One never knows when the bottom will drop out," he said.

This simile is no longer true. India is no longer dependent. She needs no patching. She is, in fact, a spick-and-span new kettle, in much better condition than most of the kettles of Europe.

FRANCE

The Cruiser "Duguay-Trouin"

The Naval and Military Record, 31 March, 1926.—The croiseur léger *Duguay-Trouin,* that was laid down at Brest so far back as August, 1922, and was launched on August 14, 1922, has been undergoing trials for the last six months. Her eight small-tube boilers worked splendidly, developing 120,000 h.p. with ease (instead of 100,000 as stipulated by contract). Similarly, her four geared Parsons turbines gave satisfaction. Condenser troubles, unfortunately, have once more interrupted her official trials at the moment when she was speeding finely along the Bay of Biscay, and she had to regain harbor somewhat ignominiously at the back of tugs—a greyhound dragged home by tortoises.

Ill-luck dogs the steps of arsenal-made ships. The 2,400-ton super-destroyer *Jaguar,* that was officially commenced in Lorient State Dockyard on August 24, 1922, and launched on November 7, 1923, and was due to be ready in 1924, has been delayed by a series of condenser troubles. She made brilliant preliminary trials, and also artillery tests that showed her five 130-mil. guns to be fully satisfactory in regard to mountings, handiness, elevation, rate of fire, and range. But last week, when steaming at 35 knots with some 45,000 h.p. against strong wind, her forward Rateau turbine suddenly broke down, and she had to crawl back to the harbor for further repairs. The *Chacal* (Penhoet built), that is also fitted with Rateau turbines, has passed with success through her trials after experiencing boiler troubles. The *Bourrasque,* of 1,460 tons, constructed by the Dunkirk, Chantiers de Franc, promises to be highly successful. She maintained with ease 34.12 knots on an average for eight hours, with a fuel consumption below stipulations. Her nominal speed is 33 knots, with 30,000 h.p. Comparative tests showed her to be good for 31 knots with 25,000 h.p., and for 32.8 knots at the rate of 340 revolutions per minute, whilst she reached 36.4 knots with 361 revolutions per minute. These remarkable results confirm those obtained with the *Simoun* (Penhoet built) that kept at 34.3 knots for eight hours with less than 350 revolutions per minute. Officers of these boats are confident they could, if forced, (which Admiralty instructions did not permit) maintain three knots above their nominal speed.

All these tests demonstrate once more the superiority of private yards over arsenals. Electrical considerations, unfortunately, caused important orders being entrusted to improvized yards, whereas the makers of the crack destroyer *Tigre* have been forgotten in the recent distribution of constructional awards. Rational business principles and appreciation of results have no weight at Rue Royale.

The *Duguay-Trouin* is an imposing and pleasing ship to look at and carefully designed on up-to-date lines. Sanguine naval men proclaim her a splendid investment, superior to anything of the kind existing elsewhere. The contention is that she has nothing to fear from the American *Omahas,* that are better armed end-on (six guns against four), but are slower by two or three knots; that she could also give the slip to the superiorly armed British *Hawkins,* over which she has, besides, the advantage of having her guns enclosed in new type turrets designed with a view to anti-chemical and aerial defense; that she is also better in every respect than the British *Enterprises* of 7,900 tons, the 7,900-ton Spanish *Alfonsos,* and the Dutch *Sumatras* of 7,000 tons. On the other hand, senior officers in majority believe a war-ship is made to fight, not to run; they deny the official version of the war

on that score; they do not draw from the sensational escape of the *Goeben* and *Breslau* the sweeping deductions generally in favor. Not lack of speed but lack of organization and decision on the part of the Allies is responsible for the flight of the German cruisers to Constantinople. With Bizerta and Malta in their hands, with destroyers and submarines, the Franco-British had the means of abruptly stopping the course of Admiral Souchon. Will and instant action only were wanting.

"*Duguay-Trouins* and all similar racers are nonsense and naval heresy," a noted ingenieur confided to me. "To strike swiftly, to deal the first knock-out blows, to destroy and sink, that is the essence of war, the ultima ratio. To achieve this, to have chances of smashing the enemy, it is necessary to possess enough defensive strength to resist inevitable blows. He wins who can withstand the most battering and fire the last shot or torpedo. Now, look at this 180-mètres long target (*Duguay-Trouin*). Excepting gun positions that are really well protected, you have extreme vulnerability everywhere, vulnerability enormously increased by the fact that the life and fighting capacity of the ship are at the mercy of a fragile and complicated mechanism. Imagine a shell landing over the engines; the game would be off. The *Duguay-Trouin* would be then in the position of a greyhound with a broken leg facing merciless bulldogs. If ocean racing is the point, she is a marvel."

That was sententious and disheartening, but young go-ahead officiers de vaisseau no longer think in gun, armor, and weights of broadside, and *Duguay-Trouins* and 36-knot destroyers are, in their opinion, ideal instruments of the new warfare the issue of which will depend on speed and range and on surprise. The inferior gun armament of the 8,000-ton croiseurs-légers (eight 155-mil. weapons) they consider as being of secondary moment in these times, when smoke shells and bombs and artificial clouds will reduce visibility at will and neutralize the superior calibers of the enemy. To blind the opponents with a shower of gas-producing missiles, nimbly to select the suitable range, to pour into them quick salvos of shells and torpedoes, and then promptly to withdraw behind a colored cloud without awaiting for the retort, "voila le jeu nouveau," that sets a premium on the small and weak provided they are nimble enough. The demand by the most progressive British publicists that cruiser speed be limited is taken as a proof that leading Admiralties are unanimous as to the growing importance of the speed factor.

It has been decided that the 8,000-ton *Duguay-Trouin, Primauguet,* and *Lamotte-Piquet,* as soon as ready, in the late spring, will leave on a flag-showing cruise in the Baltic, where the Tricolor has within the last few years been represented only by obsolete gunboats and destroyers. Three 2,400-ton destroyers are to carry out a similar cruise in the Eastern Mediterranean. Franco-American fêtes are in June next to take place in St. Nazaire on the occasion of the first naval memorial monument. The participation is expected of an American division, and also of British and Italian squadrons.

French Navy Notes

The Naval and Military Record, 14 April, 1926—That the great colonial empires of Britain and France stand or fall together is the sincere belief of thoughtful men on both sides of the Channel. French naval men are, moreover, distinctly Anglophile: the fraternity of arms of the Great War is yet living in their memory. Hence, the hearty receptions of late extended British flotillas in Britanny and in Bizerta. On the conclusion of coastal manœuvres off Algeria the Violette squadron (24,000 ton ships and destroyers) will pay, at the end of the current month, a visit to the grand British base at Malta, where our matelots remember to have been at home

during over four years of trying warfare when French and British seamen felt true brothers-in-arms.

A noteworthy strengthening is taking place in the Brest squadron, now under the command of Rear-Admiral Chauvin. This able officer is to have under his direct orders seven high-sea submarines of tried efficiency: viz., *Zédé, Dupuy de Lôme, Sané* (800-1,200 tons, 17-18 knots on the surface, 8 torpedo-tubes, and 4,000 miles radius of action), *Roulier, Marrast, Autric, Mignot* (800-1,200 tons, 16 knots on the surface, one 6-inch gun, six torpedo-tubes, and with a 6,000-mile radius of action). The three first-named, of French build, have been recently reconstructed and have carried out highly successful endurance tests of over 20 days' duration. The last four (ex-German boats modified) maneuvred last year, under Captain Dubois, for 17 days at a stretch in the Atlantic, diving and attacking every day, without a hitch of any sort. I had personally the opportunity of visiting *en détail* these boats on the conclusion of that fine performance. They were in splendid trim and high spirits were in evidence—contented, workmanlike crews, with keen, quiet, and self-reliant officers. This addition will change the character of the Escadre du Nord, that has been up to the present purely and narrowly defensive. Its possibilities for offense will grow in the near future, when it will be strengthened with nine splendid destroyers—three of 2,400 tons and six of 1,460 tons.

The 800-ton destroyers *Cimeterre, Mehl, Casque,* and *Bory* are to be sold out of the service, and the same fate awaits the nine other boats of the series, viz., *Rivière, Dehorter, Garnier, Bisson, Lucas, Magon, Mangini, Protet, Bouclier.* These 13 so-called contrepilleurs are from sixteen to thirteen years old. Whatever value they represented in pre-war times has long been a thing of the past. Two, the *Bouclier* and *Casque*, attained 35 and 36 knots fourteen years ago, which was then a creditable performance, but they carried too much fighting and motor power for their size, and even leaking was experienced at speeds of over 32 knots. Moreover, most of them were overworked, and strained during the war, pitching and rolling for weeks at sea doing blockading and scout work—a job far too hard for fragile craft of that sort. It was their tremendous wear and tear that caused French admirals to ask for "cannonnières et avisos" with less paper speed but more sea endurance and bigger guns—desiderata that were embodied in the numerous French gunboat flotillas, now so handy in the blockade of the Riff coast.

In truth, for the purposes of modern warfare, most of the French contretorpilleurs in commission are little more than costly make-believe, being too weak to stand a chance against their modern rivals or to successfully drive home a torpedo attack, and costing, besides, enormously in periodical patching up. Paris Admiralty keeps them "en attendant," in waiting for efficient boats. The four *Opiniâtres* (ex-Argentine) of 1,000 tons, four 4-inch American guns, second-hand German boilers (from the breaking up of German boats), are only fit for gunboat duties. The 900-ton *Gabolde, Roux,* and *Lestin* are much better, being good for 30 knots, and the same may be said of the ten ex-German *Grosse-Torpedobooten* that are, however, extremely wet and "shaky" when travelling headlong at full speed. As to the twelve Japanese-built 750-ton *Algeriens,* of simple and robust construction, hardly good for more than 25-26 knots, they are, so to speak, on their very "last legs," being nine and ten years old. This means that these twenty odd contretorpilleurs of 750-1,000 tons, the age of which is ten years on an average, are very inferior to the fifteen British destroyers of the *R* class (1,100 tons, 31-36 knots) that the London Admiralty recently condemned as being unworthy of the glorious White Ensign, that requires not the shadow but the substance of fighting efficiency. To confess the whole truth, it must be added that the "imperialistic" navy of old Gaul counts

sixteen more contretorpilleurs of 330 and 450 tons (*Carquois-Hussard* types) that are on an average only seventeen years old and good yet for everything but fighting. And that is not all; there are besides duly quoted an official navy lists no fewer than 70 "torpilleurs de lère classe," that were floated, part of them, in the closing years of the last century, and would make a formidable array in the naval museum.

That our republic should persist in keeping, against wear, tear, and rust, weapons of that sort as part of her fighting stock-in-trade can obviously but be considered by high-minded and the fair onlookers a grave symptom of inveterate imperialism and of evil designs, dangerously threatening the peaceful equilibrium of the hemisphere.

But such wise old policy on the part of the grave and responsible admirals in the Conseil superieur is, sad to say, being judged with undue harshness by younger "officiers de vais-seau" of the "casse-cou" persuasion, who only dream of speed, headlong dash and splash, mindless of etiquette and consequences. If such had their own way they would "scrap" the whole of the pre-war torpedo-flotillas, throwing in the venerable *Diderot, Condorcet, Voltaire,* and all cruisers of the windbag series (*Hugo, Victor, Ferry, Jules, Ernest,* etc.), so as to make a bigger heap. They would start anew on a blank slate, and trust entirely for torpedo-work to the latest inventions offering the advantages of diminutive size, reduced vulnerability, and upkeep cost and lighting speed, such as avions-torpilleurs, hydroplanes, Besson and "puce de mer" (80-100 knots per hour) and 50 knot coastal motorboats. They contend that such "poussiére navale" would represent for much less cost, and a hundred times more fighting value than the collections of lame ducklings obstructing our ports-militaires. Happily, such wild oversanguine views have little chance of getting a hearing in the Conseil Superieur Academy, where intense reorganizing is anew proceeding apace. A new bonnet or cap for our "matelots" is under examination.

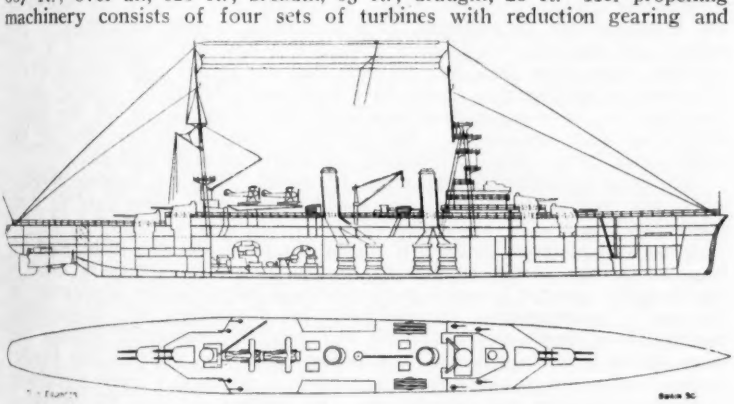
It is a time-honored tradition for every new marine minister to start reorganizing and improving, and as we change ministers every eight or nine months the process is ever going on, making the Marine Francaise the best-reorganized navy in the whole world. The defense of the sea shore or "frontiéres de mor" is anew being vastly improved, especially in the north. There were a few years since four admirals-commandants superieurs, des Fronts de mer, respectively sitting at Dunkirk, Lorient, Marseilles, and Algiers. They were found too expensive; they also, being of pushful dispositions, meddled too much with sea training, and their prerogatives clashed with those of squadron commanders. Two years since the end came and their lofty shore posts were suppressed. In their place, Admirals Jehenne and Dumesnil were entrusted with coastal defense, one in the North and the other in the Mediterranean, and they made training inspections and superintended coastal maneuvres. This system is anew being modified in the North. Admiral Levavasseur, the Brest Prefet Maritime, is to supervise personally coastal preparations on the Atlantic border. Only in wartime well he be placed under the orders of an Inspector-Général, member of the Paris Conseil Superieur. Continuous changes are not compatible with fighting efficiency; they are the unavoidable ransom of governmental instability. Moreover, the Brest squadron (three obsolete coast defense battleships) being exclusively defensive, there was in practice conflict between its commander and the Inspector-Général de l'Atlantique. This means that greater importance and independence are conferred on seagoing forces than was the case heretofore.

The announcement that the new British destroyers are to combine reduced displacement and vulnerability, together with higher speed in advance of the French "Chacals," has caused no surprise here. The unique British experience in fast craft construction is, of course, able to get superior speed

out of a given displacement and to avoid leaving anything to chance. On the other hand, the supremacy of British flotilla is maintained so long as no rival boat is allowed to enjoy any advantage in the matter of speed. When the twenty-eight contretorpilleurs, now built or building, have been commissioned (by the end of 1927), the French destroyer strength will not have attained 30 per cent of the British.

The French Cruiser "Duquesne"

The Engineer, 16 April, 1926.—The diagram of the French warship *Duquesne*, which we are able to publish, is of special interest, as illustrating both the internal and superficial characteristics of a typical cruiser built in conformity with the Washington Treaty restrictions. The *Duquesne*, it will be recalled, was laid down at Brest during 1924, and went afloat on December 17, 1925. She had a standard displacement of 10,000 tons, exclusive of fuel and reserve feed-water, but as her maximum fuel supply is 1,200 tons, it is obvious that she will displace at least 11,500 tons when fully loaded. The leading dimensions are: Length between perpendiculars, 607 ft.; over all, 626 ft.; breadth, 63 ft.; draught, 20 ft. Her propelling machinery consists of four sets of turbines with reduction gearing and



THE FRENCH CRUISER "DUQUESNE"

eight small-tube boilers, designed for an output of 120,000 shaft horsepower, which is expected to produce a speed of 34 knots. The steaming radii will be 1,200 sea miles at 30 knots and 5,500 sea miles at 15 knots. As her main armament the *Duquesne* is to carry eight 8-inch guns of a new model, paired in turrets, which are grouped on the center line as shown in the plan. The turrets are built up of 30 mm. splinter-proof steel. It is understood that no other armor is worked into the ship beyond a thin steel deck over the machinery and magazine spaces. Eight 3-inch quick-firers and eight 37 mm. automatic guns form the anti-aircraft armament. Twelve tubes for discharging the new 21.7-inch torpedo are carried on triple-deck mountings. Provision is made for transporting two seaplanes, which can be launched from the ship by means of a catapult stationed between the after funnel and the mainmast. The complement numbers 250 officers and 581 men. The *Tourville*, a sister ship, is shortly to go afloat at Lorient, and the keel of the third vessel has been laid down. A fourth cruiser of the same class is to be put in hand at Brest next October. It is of interest to compare the *Duquesne* with the Italian cruisers *Trento* and *Trieste*, which have also been designed to a standard displace-

ment of 10,000 tons, and were described and illustrated in *The Engineer* of November 28, 1924.

JAPAN

What is Japan Buying?

The Japan Advertiser, 23 March, 1926.—A graphic lucid and startlingly convincing exposition of what huge armies and navies have cost the world during the past half-century and of the price most of the nations are still paying today in their sacrifice of business prosperity to military preparations that are dictated by nationalist fears was made by Mr. Henry Morganthau in the course of an informal after-dinner talk to a group of some of the most influential men in the empire. Pointing to the tremendous economic development of the United States and to the prosperity that country is now enjoying, in sharp contrast to economic conditions in many other parts of the world, Mr. Morgenthau said that America's great advantage was that, "while England, Austria, France, Germany, Japan, and the rest of them were spending millions on their armies and navies and taxing their peoples into poverty, the United States was saving this money and using it for industrial and transportation development, thus gaining a double advantage." He pointed out that the Washington government had not maintained a real standing army since 1866, and believed that the tremendous economic development of the Republic would have been impossible if the capital which went into that development had been taxed out of the people for the maintenance of huge armaments. America had "bought" 52 per cent of the world's machinery instead of "buying" an enormous army and navy.

"The same conditions prevail now," he stated. "We are forging ahead—others are forging their own chains which will keep them fast to their debtorship."

A more illuminating method of stating the price that has to be paid for large armaments would be difficult to find. In a few sentences there is sketched the contrast between productive and unproductive investment on the part of governments. In amplifying his illustration, Mr. Morgenthau explained in a simple, understandable way America's consistent attitude that there should be no reduction of international debts nor, perhaps, any further extension of credit to nations which insisted on spending a large percentage of their revenue on war preparations. He pointed out that the individual banker when approached for a loan, always considers what the unproductive overhead charge of the applicant may be. If, taken together with the necessary expenditures, it exceeds the permissible margin for a successful enterprise, the banker will not extend one dollar's credit. This is the position that many of the nations have put themselves in, and America's reaction thereto is the natural, logical, and inevitable reaction.

While interesting and instructive from the standpoint of clarifying the American attitude toward debt-ridden nations which are plunging still deeper into debt in order to maintain armaments, Mr. Morgenthau's argument is of even greater significance to Japan in pointing out the path which this empire can tread best to its own advantage. "France is still fear-stricken," he said, "but Japan should feel herself free of fear. China is busy, Russia can not afford to indulge in foreign wars, so Japan can follow out the American plan and devote her energy to self-development and the industrialization of her country."

There has been during recent years the dawn of the realization in Japan that it is not in armies and navies that the nation's future lies but in the factories and rice fields, in the mills and in the exporters' offices. When Japan opened her eyes to look at the world in the first years of Meiji, she sought to become a great power and chose as her method of attaining this

object the building up of a huge army and navy. This has been a guiding policy during the past seventy years, a policy to which much else has been sacrificed. The position sought has been reached, and Japan goes to Geneva, to Paris, to Washington as co-equal with any nation on the face of the earth. But Japan faces just as serious a question regarding her place in the world today as she faced when the Emperor Meiji journeyed from Kyoto to the capital of the overthrown Shoguns and rechristened it Tokio. Armaments have formed the visible path that led to power, but armaments are not sufficient to keep Japan at the goal that has been attained.

The question which Japan asks herself today is: "Can we afford to remain a world power in the first ranks?" It is a question which demands an immediate answer, and that answer is most certainly in the negative if the nation continues to throw more than a third of the state income into the army and navy, into "unproductive" enterprises while the business men, the industrialists, the foreign traders, the investors in Manchuria are crying aloud for that same capital in order to put it to the lawful duty of all money—the breeding of more money.

Japan has come to the realization that her China policy can not succeed if based on armed force, but that success lies in the development of honest, peace-time trade relations with her Asiatic neighbor who is possessed of such great untapped wealth. The army and the navy have been put to one side in dealing with China. That realization must be expanded until it includes the whole world, until it includes the curtailment of armament expenditures and their diversion into productive channels. It is a difficult realization for a people with Japan's history and experience to arrive at, but unless it is reached and acted upon there is no hope of achieving the fond dreams for the future of the very men who are the most ardent upholders of a large army and navy for the glory of Dai Nihon.

America's strength does not lie in her army and navy but in her tremendous and unparalleled wealth which makes her independent of the necessity of maintaining great armaments. But that wealth has been achieved in large measure by refusing in the past and in the present to squander national revenue on guns and battleships disproportionately to the needs of industry and commerce. It is true that the United States is possessed of great natural resources, yet that fact makes it doubly imperative that the nation which is not so blessed should economize on unproductive expenditures and concentrate on economic development. The success that the United States has achieved removes the argument from the realm of the academic into one of demonstrated fact. It is no mere theory that is offered Japan but a proved and workable policy. The dramatic and compellingly convincing manner in which Mr. Morgenthau stated the problem should be given nation-wide circulation by those periodicals and statesmen (and that should be all-inclusive) who have the best interests of the empire at heart.

Japan Still Bitter at Immigration Ban

Baltimore Sun, 24 April, 1926.—It is doubtful whether there is alive anywhere in the world today another national leader whose life has been as deeply interesting as that of Viscount Shibusawa, of Japan.

From the vantage point of eighty-six years, the marvelous memory of this hale old man embraces the coming of Commodore Perry, the overthrow of the Shogunate, all the enormous transitions involved in the supplanting of feudalism by modern nationhood. Out of his own recollections he can contrast the stimulus in world power which the late war meant to his country with the almost forgotten revolt of the Samurai just fifty years ago against the ruthless supersession of old Japan by foreign "barbarism." Like

every other event of his long life, he sees the earthquake of 1923 as something relative, to be compared with the lesser calamities of 1844, 1855, and 1891, rather than as an isolated tragedy.

It is this perspective, coupled with the judicial qualities matured by his great work as a financial leader, which gives a real significance to those events singled out by Viscount Shibusawa as important. And when he speaks it is not merely as one who has watched the development of Japan for three-quarters of a century but, more significantly, as one who, in his three fold capacity of a great banker, business executive, and ethical leader, has done perhaps as much as any man to determine the course his country has followed.

Of his own accord, in the drawing room of his country home near Tokio, Viscount Shibusawa brought the conversation in the interview accorded *The Sun* round to the subject of our immigration act. It is a subject which few Japanese will raise of their own accord with an American unless the latter has broached it first. Then they will say, quite frankly, that in all their history no other country has ever hurt their pride so deeply as has America, and after saying that will, if permitted, pass to other topics.

But Viscount Shibusawa, speaking "as an old man to a young man, and not as a Japanese to an American," went voluntarily much further into this delicate theme. And he asked that if I forgot all else of my talk with him I would remember this: that while the original affront to Japan was bad enough, the assumption in America that the passage of time has wiped out the sting for Japan is worse. "A proud and sensitive people," he said, "are doubly offended when it is assumed that they can easily forget what seems a direct and personal attack."

Prefatory to this remark the Viscount had spoken of the deep respect and friendship for America which animated his countrymen during the transition reign of the Emperor Meiji. He himself, he said, brought up in an anti-foreign feudal atmosphere and schooled in the Chinese classics, had come to be so deeply impressed by the work of American diplomats like Townsend Harris as to regard America as spiritually akin to Japan, in spite of the great material differences. But of late years, in Viscount Shibusawa's opinion, the Japanese belief that the United States is above all else a nation standing for international justice has been severely strained.

"The sudden breaking of the 'gentlemen's agreement' in order to classify Japan with those people whom you discriminate against," he said, "has spoiled a splendid international relationship. The resentment aroused in my country has done much to wipe out the memory of past friendships. And it is well to realize that this resentment is as strong now as when the immigration act was first passed. It has been a hard blow for those of us who are eager to cement even more firmly the bonds between the two nations. Fortunately the damage done is not and must not be irreparable. But it is for the United States to ameliorate the situation. We cannot take the lead."

Viscount Shibusawa, for all his keen mentality and energetic nature, is an old, old gentleman. I felt that I could neither interrupt his conversation nor prolong the interview to raise the difficult but fundamental racial issue of whether severe limitations on commingling of the Asiatic and Anglo-Saxon races is not as desirable for both as Herbert Spencer maintained a generation ago. But from what other Japanese of almost equal prominence have told me I know that there is no disposition in this country to deny the racial difficulty. The objection is primarily to the phrasing of legislation in such a form as to make the recognition of a difference appear to the Japanese like a public definition of inferiority.

From a consideration of Japanese-American relations the Viscount passed naturally to the subject of the League of Nations, of which he is one of the leading advocates in this country, being president of the Japanese League

of Nations Association. In spite of the unpleasant impression created by the recent session at Geneva, Viscount Shibusawa is optimistic about the future of the League.

This viewpoint, it is interesting to note, is held by a majority of the editorial writers in the Japanese press. Over here there is a very keen appreciation of the fact that Japanese membership is at present the main factor in giving the League a truly international, as opposed to merely European, flavor. The lead given to the newspapers by the government is that Japan has much to gain, as well as to contribute, in maintaining the closest possible association with the work of Geneva.

"In the course of a long life," the Viscount said to me, "it has been depressing to realize that the more educated mankind becomes the more prone we seem to be to direct our intelligence to selfish ends. With nations as with individuals, selfishness, when combined with the power which springs from knowledge, is likely to be a destructive force. Whatever blunders it may make I think we must concede that the latent value of the League of Nations lies in the curb on national selfishness which only some such association can provide. But of course it will take time and effort before this conception can triumph over the doctrine that patriotism and national selfishness are synonymous."

"Do you regard the predominant American attitude toward the League as short-sighted?" I asked.

"That is a question which I am not qualified to answer directly," Viscount Shibusawa replied. "I may say that President Wilson's conception of a League of Nations coincided with ideas which I held before the war. Since your Congress repudiated him I have often wondered which side was right. But the more I think over the difficult problem of world peace the more I am convinced that some such arrangement as the League of Nations is essential. And obviously the greatest defects in the League as now existing are rooted in the fact that the organization is incomplete. I do not think that American membership would guarantee world peace absolutely, but it would be the greatest possible help in that direction."

On the subject of the future of Japan, which many of the leaders here view with a certain amount of anxiety, Viscount Shibusawa expressed himself as neither particularly optimistic nor pessimistic in any outright sense.

"A great deal of nonsense," he said, "has been talked abroad about the progress made by the country in the past half century. It is based on a double misconception—failure to appreciate how advanced in many lines Japan was before the country was opened to Western civilization and over-equilibrium between the old and new will be established. Our economic prob- methods as seemed necessary to our modern development.

"What has happened in Japan in the last fifty years or so is an enormous change rather than an enormous advance. We have gained and we have lost. There has perhaps been a loss in intellectual power to offset our strides in obvious but superficial lines. In spiritual matters, I think, a satisfactory equilibrium between the old and new will be estabished. Our economic problems will prove more difficult of solution."

In this connection I asked Viscount Shibusawa to tell me his opinion of the new Labor-Farmer party in Japan, an organization which was discussed at length in a preceding article. Apparently avoiding a frank expression on this issue, he gave as clear-cut a judgment on the underlying tangles as any man could pack into four sentences.

"To achieve lasting solution of all industrial problems," he said, "capital and labor must get together spontaneously and sincerely. When the government is invoked to help one side the other is liable to be injured in a way which serves only to increase bitterness and bad feeling. Our old industrial relationship of master and servant, of teacher and pupil, was a very fine one,

but it is not adapted to the modern system of production, and new forms of cooperation must be very carefully worked out to take its place."

Then, with a kindly smile on his benevolent, grandfatherly face, Viscount Shibusawa himself ushered me to the door, bowing me out with that perfect and unfailing courtesy in which neither the greatest nor the lowest of his race is ever deficient.

UNITED STATES

Vessels under construction, United States Navy—Progress as of March 31, 1926—From official sources

Type Number and Name	Contractor	% of Completion Apr. 1, 1926 Total	On Ship	Mar. 1, 1926 Total	On Ship	Contract date of Completion	Probable date of Completion
		AIRPLANE CARRIERS					
Lexington	Beth. S.B. Cpn. (Fore River)	77.2	75.3	75.3	73.1		4/1/27
Saratoga	New York S. B. Corp.	81.8	81.2	79.8	79.2		12/1/26
		AUXILIARIES					
Holland	Puget Sound Navy Yard	93.	92.6	90.4	89.8		6/1/26
		FLEET SUBMARINES					
V-3(SF6)	Portsmouth Navy Yard	99.5	99.2	97.1	96.3		6/1/26
V-4(SN1)	Portsmouth Navy Yard	32.	29.8	31.3	29.3		4/1/27
		RIVER GUNBOATS					
PG43	Kiangnan Dock & Eng. Wks.	.2	....				
PG44	Kiangnan Dock & Eng. Wks.	.2	....				
PG45	Kiangnan Dock & Eng. Wks.	.2	....				
PG46	Kiangnan Dock & Eng. Wks.	.2	....				
PG47	Kiangnan Dock & Eng. Wks.	.2	....				
PG48	Kiangnan Dock & Eng. Wks.	.2	....				

Authorized but not under construction.

Pensacola (CL24)—Plans and specifications issued to New York Navy Yard for preparation of estimates.

Salt Lake City (CL25)—Bids opened Apr. 1, 1926, but contract not yet placed.

V-5—Plans and specifications issued to Portsmouth Navy Yard for prearation of estimates.

V-6—Plans and specifications issued to Mare Island Navy Yard for preparation of estimates.

Authorized by Act of August 29, 1916, but no funds for construction appropriated.

12 Destroyers Nos. 348 to 359 inclusive.
1 Transport No. 2.
3 Fleet Submarines Nos. 169 to 171 inclusive.
1 Neff Submarine No. 108.

Authorized by Act of December 18, 1924, but no funds for construction appropriated.

6 Light Cruisers Nos. 26 to 31 inclusive.

Paris "Temps" Hits Our Foreign Policy

New York Times, 9 April, 1926.—President Coolidge's speech yesterday, in which he pointed out the caution with which the United States is approaching the World Court, causes the *Temps* to devote its leading article today to "the United States and the Work of Peace."

The conclusion of the article is that so long as the government President Coolidge now heads does not see fit to assume any responsibility in international adjustments, its hope to have a great world influence will remain only a hope.

After elaborating on the great influence America's position should bring her the *Temps* observes:

"There is no doubt that Washington has good intentions, but what worries European opinion is that, while recommending the establishment of international solidarity, America refuses to assume the slightest responsibility in the common effort necessary to establish this solidarity.

"Washington declares itself favorable to any peace organization based on justice, but straightway refuses to collaborate in this organization the moment it imposes any obligations. That is a great source of weakness, not only for Washington's foreign policy, but for peace itself.

"It is because the United States did not ratify the Treaty of Versailles, which she concluded with the active collaboration of Wilson, their responsible President and most authorized representative, that the victory of the Allies has not had all its proper results and that Germany has felt encouraged to shirk her obligations."

Blame Us for Post-War Crises

"It is in the defection of America that lies the prime cause of all the difficulties of settling reparations, in arranging interallied debts and even in solving the security problem, since the promised security compact not having materialized, France has been obliged to obtain her safety by her own means.

"Germany, not having paid us, we have not been able to pay our Allies the sums we borrowed for the support of the common cause until the common victory. England and America, not having given us the security that they promised, we had to seek our own security. There you have the secret of all the crises of the past six years. And the unwillingness of America to assume new obligations and her determination to have none for the future, has gone a long way to compromise the results of victory which the intervention of the valiant American armies permitted us to gain over the nations of prey.

"We can understand how Americans do not wish to intervene here where their interests are not at stake. Protected by the ocean and not exposed to immediate aggression, they have a different conception of security from those countries, notably France, on whom national dangers impose another conception.

"But by force of economic and political circumstances, beyond the power of any government to prevent or modify the United States has assumed in the world a rôle which she cannot renounce without admitted failure and has assumed a moral duty which she cannot dodge."

Sees Peace Without Us Impossible

"The day will come when Washington leaders will have to recognize that it does not suffice to encourage with generous words those who are trying to realize a lasting peace based on justice, but that real help must be given if those efforts are not to be in vain. As long as the United States does not assume a fair share of the responsibilities, in guarantees against aggression,

to bring about that security which must precede disarmament, the problem of general security cannot be solved.

"The American people are not yet ready to see things in this light, but experience will show them that it is not possible to exercise the influence which should be theirs without assuming the moral burdens such a rôle carries with it. Let them think of the authority of the decisions of the League of Nations if America sat on the council.

"Coolidge recognized yesterday that moral disarmament should precede material disarmament. It is a good deal to ask peoples to forget at one swoop the distrusts and hates accumulated during centuries; but security for all is organized on the basis of mutual assistance by all the nations and good-faith can hasten moral disarmament by showing all warlike nations that aggression will bring defeat.

"If America intends to remain outside this movement she risks seeing it fail and will be false to a rôle which history has offered to her. On the other hand if she frankly decides to take her responsibilities in the common effort she can hasten the reign of peace in the world. Because she has gold and the audacity of youth she can fix the destinies of the world.

"That is a noble task, but she should not let her hour pass and allow the day to come when she can no longer do anything."

Hughes Thinks Cut in Navies Possible.

New York Times, 23 April, 1926.—Whatever may be the difficulties in finding formulas for the limitation of land armaments, former Secretary of State Charles Evans Hughes, President of the American Society of International Law, declared in his annual address to that body tonight, that it ought to be possible to "follow up" the work of the Washington conference by satisfactory limitations of auxiliary naval craft.

Text of the Speech

Mr. Hughes spoke in part as follows:

During the past year the optimists and the pessimists have each had their day. In October and December the world was hailing the dawn of a new era. But within a few months the general impression seemed to be that we had suffered from an optical illusion that the old era was still with us, that the light had failed and darkness had settled upon the face of the deep.

To those who in this society hold an attitude of philosophical detachment, neither looking for the millennium nor taking counsel of despair, it would appear that there are indications of substantial progress toward the establishment of the essential conditions of enduring peace. To some, the most important of these indications will be found in economic adjustments, because of the conviction that it is idle to expect good-will and the peace that depends upon it unless it has an economic basis. Sound settlements permitting economic recuperations are indispensable, for with our human nature which is the products of eons of struggle and strife, the urge of the right to live and to enjoy the fruits of industry will make peace formulas but barren idealities if there is strength enough to win the coveted opportunity. It is the disposition to make such settlements that furnishes the test of the will to peace. The London Conference of 1924 making it possible to put into effect the Dawes plan, marked a new mental attitude—the beginning of the reign of reason after a long period of insanity. Other economic arrangements, if they could be devised for troubled areas, would do more than anything else to dispose peoples to stop thinking in terms of war. If some of the expert men of affairs, in a world full of expertness too little used, could have a chance, with the necessary acquiescence of the politicians, to deal with economic necessities prospects would be brighter.

America's Rejecting of the League

The desire for peace, the conviction that collective responsibility must be assumed, has not reached the point where states are ready to undertake obligations which are not perceived to be commensurate with their interests. Obligations may indeed be undertaken, if they are not regarded as real, or they may be assumed by states which feel that they will not be called upon for performance contrary to interest. If regarded as real, the engagement must be found to be demanded by a dominant conception of national interest or it will be declined. Without entering into an old controversy, it would seem to be clear that the United States would have joined in the covenant of the League of Nations, if prevailing opinion had not taken seriously certain commitments of the covenant which it was found could neither be explained away as mere forms of words or be accepted by the government of the United States as requiring its action in unknown contingencies and in relation to controversies to which it might not be directly related. These general commitments thus had the disadvantage of giving rise to apprehensions on the part of some, while failing to satisfy the requirements of others who sought more definite guarantees of security.

When the Treaty of Guaranty proposed for the United States, Great Britain and France failed, and the later proposal for a Treaty of Mutual Assistance fell through, the effort was made to find a satisfactory general guaranty in the Geneva Protocol. As Dr. Benes, the brilliant Foreign Secretary of the Czecho-slovakian Republic, has said: "A number of delegates at Geneva rightly believed that the League of Nations Covenant in reality contains in germ everything; the principle of the peaceful settlement of international conflicts, guarantees of security, and, finally, the principles of the limitation of armament. They believed it sufficient simply to supplement it where gaps remained. The main principle of the protocol was the prohibition of an aggressive war and of war in general, whereas by the League of Nations Covenant the sovereign right of states to wage war against one another is limited, but not entirely removed; in addition to prohibited wars there are legal wars and also wars which are suffered. A second main principle of the protocol logically supplementing the first principle, was that every international dispute which might give rise to armed hostilities must unconditionally be submitted to peaceful settlement." The progress made in the application of these principles was through the endeavor to solve the problem of defining aggression by the postulate that the criterion should be found in refusal to resort to the institutions of peaceful adjustment and to abide by the determination which might result.

Failure of the Protocol

While this ambitious and comprehensive plan was apparently accepted in September, 1924, by those then interested, "with sincerity and enthusiasm" it came to grief in a few months. It was too comprehensive; its obligations were too sweeping. They menaced those who were not parties and were found to be incompatible with the dominant interests of a great power whose cooperation was essential. The obvious lesson was that a settlement of the urgent problem had been postponed by insistence upon a more inclusive arrangement than the nations were ready to make, and that the most pressing question of security in Western Europe should be taken up directly by the powers immediately concerned. Thus, Locarno became possible.

It had also become manifest that if the League of Nations was to be efficient, as all must desire it to be, as an instrument for the promotion of European peace, Germany should become a member upon a footing of equality with that of the other great states. The powers, meeting at Locarno, by virtue of their realization of the dominant interest of each in effecting a

settlement, and directing their endeavors to an end desired by all, were able to formulate a unique series of agreements. When it came to the point of carrying out these agreements, however, it was apparent that while the formula promised well, it was thought best to have a little "collateral security" and that the idea of protection through balance of power, instead of being discarded, was still a controlling conception. Moreover, it was again demonstrated that it is not conducive to the making of necessary adjustments to have these arrangements depend upon the consent of other powers not having the same problems and not facing the same exigencies. There is no need to disparage the motive or sincerity of any power in its efforts to protect its own interests, but the fact remains that interest determines national action and that the common action of states inevitably depends upon their appreciation of community of interest. No international organization can escape the dominant motives of national policy. When the sense of common interest is lacking the best laid international plans are destined to failure. Regional undertaking, or those addressed to particular exigencies and motivated by the desire of the powers directly concerned in order to solve a common problem, hold the best promise of success.

The striking and unique feature of the Locarno Treaties—and we trust that the difficulty disclosed in Geneva will soon be overcome—lies in the recorded purpose and agreement of great powers to settle all controversies between them without resort to war and to provide practical substitutes for war. This, if made effective, will be the crowning triumph of all peace efforts—a triumph attested not by the delusive provisions of resolutions or the propaganda of peace organizations, but by the deliberate engagements of Governments.

America Joins the World Court

During the past year, the event in this country of outstanding international significance is the decision of the Senate to give its assent to the adherence of the United States, upon stated conditions, to the protocol establishing the Permanent Court of International Justice. When this recommendation was made to the Senate, it was thought that the controversy over the Treaty of Versailles had not obscured our historic policy with respect to the setting up of a permanent international court. We had had an abiding interest in international arbitration. In 1890 Congress had asked the president to negotiate with other governments to provide for arbitral determination of any differences or disputes which could not be adjusted by diplomatic agency. Our delegates at the first Hague Conference had a plan for permanent court, and when the second Hague Conference failed to set up the permanent court we had desired, President Roosevelt said: "Substantial progress was also made toward the creation of a permanent judicial tribunal for the determination of international causes. There was very full discussion of the proposal for such a court and a general agreement was finally reached in favor of its creation. The conference recommended to the signatory powers the adoption of a draft upon which it agreed for the organization of the court, leaving to be determined only the method by which the judges should be selected. This remaining unsettled question is plainly one which time and good temper will solve." President Harding, who as a member of the Senate had been through the controversy over the Treaty of Versailles, said in making the recommendation for our adherence to the protocol of the court: "It is not a new problem in international relationship; it is wholly a question of accepting an established institution of high character, and making effective all the fine things which have been said by us in favor of such an agency of advanced civilization."

That a large number of our citizens should have failed to approve this proposal must be deemed to be due in part to a lack of understanding of

the function of an international court. It is not fully appreciated that resort to the court is optional; that we are not bound unless we do resort to it; that if we have controversies we cannot decide them for ourselves and if they cannot be adjusted by diplomacy they are the subject of arbitration when they belong to the class which would ever be referred to a court. It does not seem to be understood that if we have an arbitration, the decision will depend upon the views of the umpire or third arbitrator, and that if we cannot agree upon the selection of the umpire or a third arbitrator the only way is to have him selected by some third power or chosen by lot. Many do not realize that a permanent court of international justice, with learned judges of approved character and independence, set apart to give their lives to judicial service, will afford a far more satisfactory recourse for us than the ordinary arbitral method. It is not realized that the establishment of a permanent court is in our own interest.

Court and League

But the fear has been widespread that in some way, by adhering to the protocol of the court, we should become identified with the League of Nations and this fear was fostered by the rejoicing on the part of the friends of the League and the assertion that the recommendation of the President was the first step. The fact remains that the Court was set up under a separate agreement and that our adherence will not give us a single right or impose upon us a single duty under the covenant of the League.

The most serious objection was that the court is not a true judicial institution, but is an agency of the League—a mistaken view as the statute establishing the court safeguards its independence and its judicial functions. What seems to have been lost sight of by many is that, however opposed to joining the League we may be, the nations who are members of the League are still nations with whom we must in any event collaborate if we are to have a permanent international court. We cannot set up such a tribunal without them; there is no hope of setting up another one. It should be apparent that we must either abandon our historic policy and forego the advantages of a permanent court of international justice or support and assist in safeguarding the one which has been established. If we are in favor of such an international judicial institution, our weighty influence should be exerted to maintain it.

Some seem to think that we have no interest in such a court if it is disposing of the disputes of others. Our domestic experiences should teach us differently. The most peaceably disposed citizen, who never gets into court has the liveliest interest in the maintenance of judicial administration to settle the controversies of his contentious neighbors and thus aid in keeping the peace.

After a long debate the question has been settled for us. The conditions and reservations attached to our adherence have been laid down by the treaty-making power in accordance with our constitutional method, and so far as we are concerned these conditions and reservations are final. No one has any authority to modify them or to explain them away. They speak for themselves. In providing that we shall not assume obligations under the Covenant; that we are to have the right to participate in the election of judges; that we are to bear a share of the expense; that we may withdraw our adherence at any time and that the statute establishing the court shall not be amended without our consent; we are making conditions to which it would seem no just exception could be taken.

Prospect for Disarmament

The year has witnessed renewed efforts to bring about a limitation of armament. Competitive armament is the outward sign of an inward dis-

trust and will go on until confidence replaces fear and suspicion. It is said that there must be first a mental and moral disarmament, by which is meant that nations must feel secure and cease to think of war. If the Locarno treaties should fail, there would be no prospect for disarmament. If they become effective, the way is open, but it is one of the greatest difficulty in finding satisfactory standards of military strength and practicable measures of limitation. It would not be profitable to attempt to discuss these obstacles. I may, however, be permitted to say that whatever may be the difficulties in finding formulas for the limitation of land armaments, it ought to be possible to follow up the work of the Washington conference and to provide satisfactory limitations of auxiliary naval craft. For this purpose it is not necessary to find formulas for all states having ships. Here again the effort to be comprehensive may stand in the way of practical undertakings. There are only five powers with navies of considerable size. These powers are at peace and contemplate no acts of aggression. Naval strength is relative and its standards may readily be defined. Competition while restricted as to the great and expensive battleships should not be permitted to go on with respect to the smaller craft. It is an economic and preventable waste which the states concerned cannot afford. It is hoped that at least this open path to further limitation of naval armament, which involves no sacrifice of security, but gives relief to burdened peoples, will be pursued, and that we may next year record further progress in testing the sincere desire for peace by the voluntary restriction of the unnecessary multiplication of the instrumentalities of war.

Whatever may be before us, the prospect is better than it was a year ago. We seem to be emerging from a lawless period, from conditions of extreme discouragement, and despite the temporary setback the opportunity is so plain that it is difficult to believe that advantage will not be taken of it. Peace is a state of mind. If the state of mind exists, it will find expression in agreements and institutions, in the willingness to assume obligations of mutual self-restraint. To lose the momentum that has been gained would be an incalculable disaster.

Editorial Opinions

Britain Expects to Unite Entire Defense Force.—New York *Herald-Tribune* (Independent Republican) April 21, 1926.—By Harold E. Scarborough.—A single Ministry of Defense, controlling the army, navy and air force, now is being predicted as a near possibility in Great Britain. Prime Minister Baldwin has announced that the question will be discussed in the House of Commons as soon as possible, and it is reported that government opinion is inclined strongly in favor of the proposal.

The report of Colonel Wyn's committee, which recently studied the economies of the fighting services, has not been made public yet, but it is thought the committee favored a Defense Ministry, and the economy which its advocates hope such a ministry would effect, especially in the administrative and supply branches is likely to prove a powerful argument with the government, which now is faced with a budget apparently irreducible much below $4,000,000,000.

It also is felt that since the independent air force has been created, effective national defense requires the completion of the process by a united command. A reorganization of the air force has just been announced which divides it into three main branches—the fighting group, the bombing group and the administrative training group. There also will be an army cooperation group and a naval group.

As a result, the army and navy now each have what is more or less their own aviation, while there is a third service—the air force proper—in addi-

tion, especially charged with the defense of the nation against an air attack, to which its geographical situation renders it peculiarly liable. This arrangement, however, not only has created much dissatisfaction in the navy, which is far behind the United States Navy in aviation, but causes certain overlapping both in strategy and administration.

The creation of the air force is largely an added expense without guaranteeing a really effective defense. To meet the opposition which the project for a defense ministry is sure to elicit from the powerful navy group various suggestions have been advanced, such as a proposal to give the air force to the navy, making the latter largely an air organization instead of largely a sea organization. Even if desirable, however, this probably would be impossible, owing to the jealousy of the air force officers, who now have a vested interest like the army and navy.

But economy is becoming more and more a pressing need, and no doubt public opinion is inclining strongly in favor of a unified defense ministry.

MISLEADING NAVAL FIGURES.—Oakland (Calif.) *Tribune* (Independent-Republican) April 5, 1926.—From the figures of comparative naval strength the expert may arrive at whatever conclusion he seeks. When appropriations are sought, those figures are used to show that this country is far behind the strength allowed in the 5-5-3 agreement; on Navy Day they are often cited to prove our leadership.

Recently the British Admiralty issued its *Blue Book*, a presentation of data concerning the ships of the chief navies of the world. According to that authority the American Navy out-numbers the British by 543 to 444, and this country has also "secretly armed its battleships with 5-inch anti-aircraft guns." The figures are intended for British consumption, and with the hope of naval men there that they will aid in the building up of a large fleet. With those figures the Navy League of the United States takes sharp issue.

The *Blue Book* summary is misleading, the Navy League asserts, because it includes in the American lists many vessels which are obsolete even under the British definition. Moreover the various effective age-limits assigned different types of vessels have been increased over ages assigned in previous *Blue Books* which changes do not materially affect the British list, but cause inclusion of numerous older vessels in the fleets of other countries. And the League says that the charges that our Navy has secretly mounted superior aircraft guns is stupid, for full information on the subject was published to the world in April, 1925.

Correcting the list to remove from consideration obsolete vessels, the Navy League has it the comparison is not that of 543 to 444, but 480 to 430, the United States having fifty more ships. But the total tonnage is 1,079,650 for the United States to 1,311,836 for Britain, showing that our superiority is in war-built destroyers and submarines, while Britain has more of the heavier types.

"The mere fact," says the League, "that the British Navy employs 95,000 men in carrying on its naval activities, in comparison with the 82,000 men in our navy, is a check on the tonnage comparison."

From the standpoint of the Navy League, which would have this country's floating defenses up to the limits of the treaty, these are distinctions to be borne in mind.

WHY JAPAN WANTS PEACE.—Baltimore *Sun* (Independent-Democrat), April 18, 1926.—Henry Morgenthau, just back from a six-months' circuit of the globe, emphasizes present day Japanese-American trade relations as the impregnable guarantee of peaceful relations between the two nations.

It is a convincing argument which our former Ambassador to Turkey presents as a result of his investigations in Tokio, and one which deserves much more consideration than is generally given by those Americans who talk lightly of trouble with Japan. That country last year received from the United States 88 per cent of her automobiles, 70 per cent of all her building and construction material, 50 per cent of her petroleum products, 50 per cent of all the machinery put into operation during the year, 54 per cent of her leather, and 40 per cent of her wheat. And year by year these percentages are growing.

The mind of an economist is not needed to realize how completely destructive of Japanese commercial life would be the mere termination of trade relations with this country. Even if Japanese commerce were able to maintain trade routes with other nations, the commodities cited above could not be obtained elsewhere in anything like the necessary quantities. Mr. Morgenthau uses conservative language when he says that "any war, quite irrespective of the military outcome, would do irreparable damage to Japan."

That the Japanese realize this fact is apparent from the solicitude for American friendship shown by all their leaders, in spite of the resentment which still smolders because of the wording of our exclusion act. It will be well when a similar realization of the necessity for good relations penetrate more fully into our own national consciousness. For any one with a modicum of business sense, of which as a people we are supposed to have our share, can see the stupidity of needlessly offending so good a customer.

Those who are interested in the continuation of our present prosperity should take the trouble to inform themselves more fully on the importance of our Japanese market, and to pay less attention to those jingoes who have not learned from the example of France and England that victory in modern war may be almost as destructive as defeat.

Navy's Peace Time Activities.—Seattle *Times* (Independent).—July 27, 1926.—Representative William A. Ayres of Kansas, in discussing the naval appropriation bill recently, rendered a notable service to the country by pointing out some of the many peace-time activities of the Navy.

People living in coast cities have a fair idea of the services performed by our fleet, but the inhabitants of interior states have no easy means of learning what the Navy does in time of peace. While we on the Coast realize that the fighting ships actually are an industrial asset, the people who live far from the sea think of the Navy as an instrument of war and as having no economical value. The address by Representative Ayres, who comes from a state which has no direct contact with the Navy, is, therefore, all the more valuable.

The Navy is a powerful instrument for peace. It does more to prevent war than all the speeches of the pacifists in the world. As President Coolidge once said, "It has never caused a war or tempted the country to go to war."

The list of peace-time achievements of the Navy, as presented by Mr. Ayres, is long. Its many humanitarian missions, its diplomatic services, its contributions to industry and science, its protection of our trade routes, its accomplishments in the field of health preservation and its scientific research work are but a few of its activities.

"I wonder how many of our people realize that the Navy's errands of mercy have saved more lives than have been destroyed by its guns in all our wars," said Representative Ayres.

When an earthquake wrecked Tokyo and Yokohama it was an American warship that first brought aid. The Navy was on the job when thousands of starving refugees were driven out of Smyrna by fire and the vengeful Turks. Naval medical officers have rendered invaluable service in stamp-

ing out disease in Guam, Samoa, and the Virgin Islands. The Navy was on hand with supplies and a Marine guard when Santa Barbara was visited by an earthquake last year.

In addition to its scientific and humanitarian enterprises the Navy furnishes protection to our foreign trade, which exceeded $8,000,000,000 last year. The promotion of commerce and the safeguarding of trade routes make our sea force an industrial asset valuable to the entire country.

The Navy is ceaselessly at work. Its services are as necessary to the people of Illinois, Iowa and Kansas as to the people of Washington, Oregon, and California.

AVIATION IN THE NAVY.—Washington *Post*, (Independent).—April 11, 1926.—The purpose of the Butler Bill is to establish an airplane program for the Navy and to adjust and define the status of the operating personnel, to fix the number of planes to be operated, and to provide a five-year building program to furnish these planes.

The naval committee prepares a construction program and obtains the approval of Congress, after which the appropriation committee recommends the necessary appropriation. The latter committee cannot report a bill for the expenditure of money unless Congress so authorizes. As an illustration, the regular naval appropriation bill of this Congress carried an item for the purchase of 137 new airplanes at a cost of $9,062,000. This item went out on a point of order, because Congress had not authorized any such expenditure. The Butler Bill provides for 235 airplanes for the navy and Marine Corps, to cost not to exceed $12,285,000 for the first year, the building program to continue five years.

On November 1, 1925, there were in the Navy 993 naval airplanes, but only 408 were serviceable, and 398 were what are termed "obsolescent"; that is, formerly serviceable but rapidly going into the discard. The House naval committee believes that in 1927 there must be built and purchased 213 replacement planes; in 1928 there must be built 246 new planes; in 1929, 268; in 1930, 290, and in 1931, at least 313 new planes. This program will, in the opinion of the committee, give the Navy about 1,000 serviceable planes in 1932.

At present there are about 1,842 enlisted men assigned to aeronautical duty, whereas the bureau of aeronautics is allowed 3,842 men. The small number of men is due to lack of planes. There are now about 675 officers and pilots. The total number of officers and enlisted men in naval aviation, according to the committee, should be 6,647.

The Navy Department is the sole governmental agency charged with the development of airships. The government spent $1,000,000 for the British-built *R-38*, $300,000 for the Italian-built *Roma* and $200,000 for the German-built *Los Angeles*. The Butler Bill provides for the construction in the United States of two airships to cost not to exceed $8,000,000 and one experimental metal-clad airship to cost not to exceed $300,000.

The Morrow board's aviation report contains this:

> Our Navy was the first among those of the world to adapt the airplane to use on and over the sea. This was accomplished through the development of seaplanes and flying boats. In these types of airplanes we have continued to hold our lead. We have done more extended cruising with large seaplanes than any other navy. Our naval aviators hold at least their share of world records and have to their credit many outstanding accomplishments.

Aviation in the Navy has a bright future. It should and will receive generous congressional support.

A DISTORTED VIEW.—Vallejo *Chronicle* (Republican).—April 11, 1926.—The suit brought by the American Association for the Advancement of Atheism against the Treasurer of the United States to prevent the payment of salaries to Navy and Army chaplains is deserving of a hearty laugh. And that is just about all the consideration it will receive.

One James I. Elliott, a member of the association, is the plaintiff and bases his action on Article I of the Constitution which provides that "Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof."

If the employment of chaplains in the Navy and Army constitute a law establishing or prohibiting religion, then Mr. Elliott is right and we should throw all of these clergy-men out of the service. But at the same time we will contend that the laws under which his American Association for the Advancement of Atheism is incorporated also constitute such a violation of our fundamental law, and he and his brethren must therefore disband and we will stop the salaries of those officers who are administering the law. Maybe Atheism cannot be classified as a religion but it is a cult of some sort or other.

By the employment of chaplains in the military branches the government is in no way establishing religion, prohibiting it or seeking to dictate to anyone the form of religion he must or must not adopt. These clergymen represent many branches of the Christian religion, some of them may even be Atheists. They make no effort to force their beliefs on others; they are merely standing ready to conduct religious services for the benefit of those who desire them. They fill important needs in both the Navy and Army.

But there is no need to become excited. Mr. Elliott's suit will soon be forgotten, and so will he. And the Army and Navy chaplains will continue to render the important service to the personnel of our national defense which they have done for many years.

American Wireless is Blocked in China

By Thomas F. Millard.—The New York *Times*.—12 April, 1926.—Shanghai, March 2.—For several good and sufficient reasons the American people and especially the press in America, ought now and then to notice developments of what variously is termed in China the "American wireless contract," the "radio embroglio," the "wireless wrangle," and by a few other colloquialisms. Behind and beyond the prolonged diplomatic squabbling among important governments which has marked this case from its inception lie matters of serious—one may say of tremendous—consequence, not only to the particular interests of the United States and of China, but also to mankind.

For although this dispute on the surface is about a construction contract of no great value, what really is involved is control of one of the most important factors in modern civilization.

On the face of the matter the State Department is fighting to sustain the "Open Door" in China, which is part of a cardinal policy of the American Government. But in addition it is trying to prevent any single power, or a combination of governments having the advantage of previously set positions from securing a monopoly in this part of the world of the new element which promises to bring all nations and peoples of the earth into instantaneous, constant, and inexpensive communication.

It is possible today, scientifically, to transmit this article to *The Times* by radio at a comparatively low cost, or even for me to sit in a booth in Shanghai and telephone to the *Times* offices in New York. All that is required to make that transmission feasible is to get up the necessary apparatus. (I

do not mean that this new natural element has been brought completely under human comprehension and control, or that its uses and economics are yet satisfactorily adjusted; but what I indicate can be done now.)

But although large constructing and operating concerns are willing to build the apparatus and to operate it, and although some years ago the Chinese Government contracted with an American company to build a number of radio installations in this country, and apparently still desires to go on with the undertaking, the project has been so entangled in a web of diplomatic and other obstruction that it seems to get nowhere.

This case commenced five years ago and the official diplomatic papers concerning it would fill volumes. It is estimated that telegrams about the case have cost over $100,000. To follow all its turns and complexities would baffle the traditional Philadelphia lawyer. One time and another I have myself written enough about the case to make a little book.

American Contract Made in 1921

Some background is helpful.

In January, 1921, the Peking Government made a contract with an American concern (Federal Telegraph Company of California) for it to build a number of wireless stations in China. That contract (which erroneously was described as a "concession") provided that the American firm would finance the construction by issuing bonds secured by the enterprise, and that the constructors on behalf of the bond-holders would operate the plans for the Chinese Government until the bonds were paid or otherwise liquidated. Those provisions were not because the contractors had any purpose to retain control of the plants after they were built, but were because, since it was expected and intended that the bonds would be sold principally to American investors, it was felt that that could not be done unless a competent management was assured. The contract had no monopolistic provisions.

When the existence of that contract became known, which was very soon after it was signed, some foreign governments at once began diplomatic efforts to have it cancelled. Those efforts, the motives which inspired them and arguments which supported them provide a concrete example showing that, however often some governments publicly profess adherence to the Hay doctrine of respect for the sovereignty of China and of the commercial open door here, the old policy of special foreign rights and positions still is very active.

Japan Files a Protest

First, Japan.

In March, 1918, the Chinese Government was induced, under strong diplomatic persuasions of Japan, to make an agreement with a Japanese firm (Mitsui & Co.) for the construction and operation of a wireless plant near Peking. In a letter confirming that contract was a sentence giving the Japanese company a monopoly on wireless communications between China and other parts of the world for thirty years. That agreement was kept secret. It coincided with the period of greatest Japanese pressure and influence at Peking, with the orgy of graft that attended the notorious Nishihara loans.

On learning of the American contract, the Japanese Legation in Peking made a strong protest to the Chinese Government on the ground that the project is an infringement of Japanese rights under the secret agreement of 1918. Both the Chinese and American governments at once disputed the exclusive and monopolistic character of the Japanese agreement. The Wai Chiao-pu (Chinese Foreign Office) pointed out that the monopolistic provision did not appear in the regular text of that agreement, but was based on a letter written by a Chinese official apart from the agreement.

Insist Upon the Open Door

The State Department and the American Legation in Peking (Charles R. Crane was American Minister then) at once saw that a principle of great importance was involved in the case. If any foreign firm or government, by secret agreement with Chinese officials, obtained perhaps by bribery, or by intimidation, or in any way, thereby could create for themselves monopolistic, economic and commercial rights in China, then the open door and all treaties giving most-favored-nation status to foreigners in China went on the scrapheap. If nationals of one nation by that method could monopolize radio installations and communications in China, and between China and all other countries, then nationals of one nation legally could monopolize any other industries and forms of commerce here.

On that point of principle the State Department at once took a position which it holds firmly at the present time. Under dates of June 9, 1921, and July 1, 1921, the Chinese Minister in Washington, Dr. Alfred Sze, and Secretary of State Hughes exchanged notes on the subject, in one of which Mr. Hughes used these words: . . . . "Confirm this Government in its belief that the adverse claims which have been urged as excluding the Federal Telegraph Company from participating with the Chinese Governemnt in establishing wireless communications are founded upon assertions of monopolistic or preferential rights, in the field of Chinese Governmental enterprise, which cannot be reconciled either with the treaty rights of American citizens in China, or with the principle of the open door."

Britain and Denmark Object

The Japanese protest was not the only complication. Hardly had it been filed at the Wai Chiao-pu when two other governments also entered the field and protested that the American contract infringed rights which in former years were granted by the Chinese Government to their nationals. The British and Danish governments separately (but I believe in private collusion) advanced claims in behalf of British and Danish cable companies to the effect that those concerns had especial and exclusive communication rights with China.

That made the situation at once complicated and interesting. There were three separate foreign concerns each claiming to have what amounts to a monopoly of the same thing, under three distinct agreements. How there can be three legitimate monopolies of one thing is not plain; but the Japanese, British, and Danish legislations in Peking seemed to see no discrepancy in their positions, and, indeed, for some time they acted evidently in diplomatic sympathy with each other.

The motives of those moves were obvious. Those three governments simply combined to prevent an outsider from breaking their hold on communications and their future development. (It appears that the Danish cable company really is British owned.)

In fact, any monopolistic claims of the British and Danish cable companies, based on old agreements made in the early age of transmarine telegraphs, long ago were vitiated by the march of events.

Russia's advance eastward brought land telegraph lines to cross the frontier of China and hook up with China's internal telegraphs. Also, after Japan got a foothold in Manchuria and annexed Korea, her land telegraph lines entered China. A German cable (now Japanese) broke into the ring from the Caroline Islands after Germany acquired Tsing-tao. And an American company (Commercial Pacific Cable), pushing westward to give the United States direct communication with its Far Eastern frontier and naval station, the Philippines, landed a cable from Guam at Shanghai.

Governments Installed Wireless

Then came wireless telegraphy.

The French built a radio installation in the French concession in Shanghai, which now is strong enough to communicate directly with Europe, and, which connects with a French plant in Peking. The American Government erected a wireless plant in its legation grounds in Peking which can reach the Philippines and Hawaii. The Japanese put a wireless station in their legation in Peking. Not much attention was paid to the Chinese Government in making those provisions, although in each case its nominal assent was obtained, I believe.

The significant point is that any alleged monopolistic rights inhering with those early cable agreements had been washed out for many years by scientific discovery, coupled with a desire of governments for strategical communications under their control.

It was very interesting, therefore, to observe some important governments trying, by a process of diplomatic circumlocution, to hold advantages which control of communications with and in China gave them politically and strategically and commercially; and particularly their efforts to prevent Americans from breaking into that ring. So far the American contract, although now free of diplomatic obstruction in some degree, has been held up. The how and why of that are complicated.

One reason for delay is shifts in the corporate entity of the American contractors. The original company which got the contract has become connected with the Radio Corporation of America. Then since that contract was signed there has been great progress in knowledge of radio and great changes in radio equipment and methods. Those discoveries required changes of the agreement.

The contract has been revised, conditions to satisfy the Chinese Government have been met, everything is prepared to move definitely in construction; yet the final agreement remains always lacking something, perhaps the signature of a Minister, perhaps a trifling change of phraseology. But always something.

Private Negotiations Go On

Meanwhile other factors have appeared. The marine cable companies, thwarted in their attempt to establish exclusive rights in China, apparently have turned to an effort either to obtain a majority interest in the principal radio companies or to effect some kind of amalgamation and working agreement with them in overseas business. Investigations of the United States Government in the course of its study of world communications and its effort to bring about international agreement for their impartial regulation revealed that some supposedly American cables really are owned abroad.

The Japanese-built wireless station near Peking, which is the nucleus of Japan's diplomatic effort to establish a radio monopoly in China, was completed some years ago. It never has worked properly and now it is practically obsolete. Behind the scene of diplomatic action efforts are being made to bring the Japanese plant into agreement with the Radio Corporation of America under a general plan of cooperation in Eastern Asia and the Pacific. This scheme so far has not gone through because, for one reason, the Japanese want to put in their Peking plant at an exorbitant valuation. They seem to want to capitalize in this way their power of diplomatic obstruction.

The first diplomatic position of the American Government—that any monopolistic foreign rights in China contradict the Open Door—seems to be established. Opposition to radio installations here under American management, and with American equipment no longer really takes that ground. If those foreign concessionaires have not yet done so, the major Foreign Of-

fices have come to realize that no one government and no single set of nationals, corporate or other, will be allowed hereafter to control international communications, or to establish a foreign monopoly of communications in and with China.

I will not trouble to show the importance of communications in modern civilization, and how rapid and copious interchange of information and ideas among peoples and nations tends to dissipate prejudices and suspicions and to prevent serious misunderstandings. That can be taken as granted.

Fears "High Cost and Meddling"

And nowadays the peoples of different nations and in remote parts of the earth want to know about each other. Science has provided a way to rend the old veils. Only high cost and the meddling of governments block greater and freer international press and oral radio services.

For a while, a year or two ago, American naval radios in the Pacific were permitted to transmit a limited amount of press telegrams at a charge of about one-seventh the marine cable rate; but the outcry (initiated, of course, by the interested corporations) about government competition with private enterprise stopped that. And one foresees that, possibly, after this particular diplomatic case passes into oblivion, and up-to-date radio installations in China are operating, we may be faced with a radio-cable combine which will keep press and other transmission rates high.

It is evident that this question ultimately will demand the supervision of governments, not a supervision actuated as in the past almost wholly by national political and strategical considerations, but, as now with international letter posts, by broad requirements of world policy and peace.

Must Keep Submarines

Washington Post, 25 April, 1926.—In his address at the Associated Press luncheon on April 20 Secretary Kellogg said: "Our representatives at the Geneva meeting will help to the uttermost of their ability in preparing the way for agreements for the further limitation of naval armament at no distant date. Our people are practical idealists. They believe in dealing with what is visible and tangible . . . . Thus our representatives at Geneva will endeavor, as far as possible, to use their influence in favor of projects which may be practical in their application and realization in their development.". Mr. Kellogg also said: "There is danger that the competitive construction which formerly existed, particularly with respect to capital ships, may still be continued—in a less aggravated form it is true—with respect to cruisers with other types of naval craft not dealt with by the Washington treaties."

It is well understood that the British delegates at Geneva will have a definite program to offer, and that one of the proposals to be urged by them will be the abolition of submarines. The United States leaned toward the idea of discarding submarines when the subject was considered at the Washington Conference, and possibly the American delegates at Geneva will be instructed to opprove of the British suggestion. But it would be a grave mistake.

France and Italy will not imperil their national defenses by doing away with the submarine. It is the only effective means of guarding their coasts which is within their financial resources. So long as France must maintain unimpeded communication with her African possessions, from which she draws man power in case of emergency, it is idle to expect her to agree to the abolition of the submarine. Italy is in the same position. With efficient submarines, France and Italy are assured of their share of the use

of the Mediterranean. Without them both France and Italy would be subject to mortal blows from the sea.

The United States is not building up a great fleet. It has agreed to restrict the building of capital ships and is behind both Great Britain and Japan in cruisers. Not possessing a navy of superior power, the United States is unable to effectively to defend the Panama Canal and Hawaii except with submarines and air forces. The bulk of the Navy's submarines are now in the Canal Zone and Hawaii, where they belong. The submarines can prevent a fleet from approaching or blockading the canal. As purely defensive craft they are not properly subject to denunciation as "inhuman," and they have the advantage of great effectiveness at small cost.

As Mr. Kellogg says, the American people are practical idealists and believe in dealing with projects which are practical in application and realizable in their development. The project to abolish submarines by international agreement is neither practical nor realizable. As a coast-defense weapon the submarine is indispensable, at any rate while the range of air fighting is comparatively limited. By keeping aircraft carriers away from the coasts, submarines can practically prevent oversea air attacks.

The United States should agree with other nations to outlaw the sinking of passenger vessels by submarines, but it can not afford to outlaw coast-defense submarines. To abolish submarines would mean either the destruction or capture of the Panama Canal or the building of a huge fleet to defend it.

AVIATION

Operation of the Air Mail and Its Possible Application to Commercial Operations

Mechanical Engineering, May.—At the present time the air mail is operating a transcontinental service daily in both directions between New York and San Francisco, and an overnight service between New York and Chicago in both directions nightly excepting Saturdays, Sundays, and legal holidays.

The night service between New York and Chicago is probably the most difficult task that has ever been attempted in the operation of aircraft. It involves flight over 300 miles of mountainous and heavily timbered country in Pennsylvania, with weather conditions that change more rapidly than in any other section of the United States, and about 50 per cent of the flying is done above low clouds and fog, and out of sight of the ground.

It is proposed to discuss in this paper the most important problems in the operation and maintenance of these services.

Flying Personnel

Pilots play a very important part in the operation of airplanes and must be thoroughly trained and capable men, who can handle their ships in a business-like manner without taking any unnecessary chances.

A pilot to qualify in the Air Mail Service or in regular scheduled commercial operations should have had at least 400 hours in the air, 200 of which should have been back of a Liberty or larger engine, with at least 100 hours in cross-country flying. A college education is desirable, and also a knowledge of navigation. It is found that the highly-developed mind is less likely to make mistakes when quick decisions are required. A pilot should be in good physical condition, with good eyesight as the most important physical qualification.

It is desirable that pilots have learned to fly before they were twenty-five years of age. The young mind seems to grasp more easily and retain longer the finer points of flying, just as a youngster can be taught to drive a car much more readily than an older person. The "good flying life" of a

pilot has not been definitely determined; however, after checking the records of eighty-seven pilots over a period of ten years, it seems safe to state that the following rule will apply to the average case: (If a pilot learns to fly before twenty-five years of age he may expect twenty years of "good flying life."

The Air Mail Service considers it just as essential for a pilot to know his run as it is for a railroad engineer to know his curves, switches, cross-overs, signals, yards, stops, etc., and before a pilot flies mail he must be familiar with every emergency field, beacon light, weather signal, and mountain range, and with the local weather conditions along the course.

A pilot's run averages about four hundred miles, with a service stop at the middle of the run or about every two hundred miles. On such runs pilots can fly four hours per day and three or four days per week without any indications of going stale.

The labor turnover of pilots is very low. Recently there was a period of nearly two years when the Air Mail did not hire, discharge, or lose a pilot from any cause. Forty-three pilots were on the payroll, and more than three million miles were flown during that period: All indications are that the supply of pilots will be ample for several years to come, in view of the fact that there were about ten thousand pilots trained during the late war.

Flying Equipment

The efficient maintenance of planes and motors is the most difficult as well as the most important work. It involves a considerable amount of detailed work by thoroughly trained mechanics, with very careful supervision and inspection. It is even more important to have planes and motors in good condition than to have good pilots to fly them, and the morale of good pilots can be easily ruined by giving them plane and motors to fly that are not in proper condition.

The air mail changes planes and pilots about every four hundred miles in very much the same way that railroads change engineers and engines. The same planes and pilots are kept on given runs. When a plane arrives at the end of its run it is received by a crew composed of a crew chief, a rigger, an expert motor mechanic, and a helper. These men first assist in transferring the cargo to the departing plane, then the motor man proceeds to check every detail of the power plant and it functioning. At the same time the rigger checks every detail of the plane and the helper supplies the ship with fuel, oil, and water under the direction of the crew chief. The amounts of fuel and oil taken on are very carefully checked against the flying time. After the crew chief has passed it, the plane is gone over by an inspector, and when passed by him it is put in its assigned place in the hangar until two hours before its next scheduled trip. It is then brought out and completely checked again by another crew. It must also be passed by the chief mechanic before it is turned over to the pilot.

It is possible that some of this checking and double checking might be eliminated with the improved type of planes and motors that are being produced at at this time, and it seems likely that the more important commercial companies will use more modern and efficient flying equipment.

Air mail records for the past year indicate that mechanical difficulties which cause forced landings occur once during every four hundred hours of flying. Thirty per cent of these mechanical difficulties are due to the cooling system, 29 per cent to ignition, 11 per cent to carburation, 8 per cent to lubrication, and the remainder to miscellaneous failures.

It is interesting to note that most of the mechanical difficulties are in the cooling system, although practically all of these failures are material failures and not difficulties inherent in the principle of watercooling. More

than 60 per cent of the cooling difficulties with Liberty engines arise from cracked cylinder water jackets, and it should be remembered that the Liberty cylinders are about eight years old and that the water jackets are of welded sheet steel. This difficulty with the Liberty engine water jackets will be the eventful reason for abondoning the use of Liberty engines in favor of the more modern engines with integral cast water jackets which eliminate water-jacket difficulties almost entirely.

The ignition system of the Liberty engine is also a problem worthy of serious consideration. It was designed more than eight years ago, and no doubt a much more efficient and reliable ignition system could be produced today.

Service planes average about eight hundred hours flying before major overhaul and rebuilding (this includes planes damaged in accidents). After about five hundred hours the fabric covering is removed by the field operating force and the plane given a very thorough inspection when stripped of covering. Only one plane failure has occurred in the last five years. This was due to the failure of a control stick where the steel tube was welded to the U-shaped fitting at its base.

As regards spares, a plane is kept in reserve on the ground for every ship in the air and a spare motor is available for every plane in the air. The stock of spare parts carried at the operating fields is very small as most of the spare parts are assembled into complete flying units which are always tuned up and ready for use in case of an emergency.

The number of spare ships and motors will be considerably reduced when modern equipment especially designed for the work is used, and it should be remembered that the air mail is still using war equipment which requires a considerable amount of work to make it suitable for air mail use and complicates the maintenance problems considerably.

Ground Personnel

Ground personnel plays a most important part in the operation of airplanes. A thorough organized force of trained mechanics under careful supervision is required to obtain efficient results.

The supply of good airplane and motor mechanics is not keeping up with the present demand. It has been found necessary to start training mechanics during the past year, and it seems likely that commercial operations will have to train a considerable portion of their mechanical force. The training of a force of mechanics and the formation of a smooth-working organization require time.

Airways and Airports

The terminal fields should comprise not less than 120 acres and have runways at least 2,400 feet in length in two directions. Suitable hangars should be provided for the storage of the desired number of planes, together with the space necessary for office, shops, stock rooms, etc. If night-flying operations are involved, all building should be flood lighted in signboard style, to give daylight perspective. Equipment should be provided for flood lighting the flying field itself, and the field should be outlined with boundary lights. An illuminated wind-direction cone should be provided, and a revolving beacon light which will guide the pilot to the field.

Accurate weather information is essential to flying operations, and each terminal field should be provided with a thermometer, barometer, and anemometer. A ceiling light to determine the height of clouds at night is required; the ceiling is obtained by pointing a concentrated beam of light upward at a 45-degree angle and using a simple method of triangulation.

Rapid means of communication for the despatching of planes and the sending of weather information are essential, and it seems likely that either

telephone or telegraph lines along the course with stations at about 50-mile intervals will be provided for the more important commercial operations. When we stop to consider the facilities which the railroads have for the control and information of the engineers driving their trains, it seems quite reasonable that at least some of these facilities will be provided for commercial aviation.

Beacon lights should be provided at one-mile intervals along the airway. These lights should be automatic in their operation to the greatest extent possible in order to eliminate the excessive cost of caretakers.

Emergency fields should be located from five to ten miles apart along the course, according to the physical aspect of the country. A typical emergency field comprises about forty-five acres and is about 2,000 feet long and 800 to 1,000 feet wide. An emergency field should have the necessary drainage to allow safe landing during the wet seasons. A revolving beacon should be provided to guide the pilot to the field, also an illuminated wind-direction cone, and the emergency field should also be outlined with boundary lights.

Radio direction finding should be developed to assist pilots when bad weather conditions render some of the beacon lights invisible.

Signal devices should be located at 50-mile intervals indicating to the pilot passing over what the weather conditions are for fifty miles ahead and warning him in case bad storms develop while he is flying. It seems reasonable that a pilot should be controlled by signals very much in the same way that a railroad engineer is although it is not likely that it will be necessary to provide signals at as frequent intervals as in railroad operation.

It has been said that the Air Mail Service has the best-lighted airway in the world. However, it has been lighted only a little more than a year, and already it can be seen where vast improvement is possible. The author believes it safe to state that an airway can be so prepared and lighted as to insure just as safe and regular operation as exists in any method of transportation today at a cost of only about 10 per cent of a single-track railroad of the same length.

The term "airway" has been used in many different ways, but use should be restricted as applying only to emergency fields, beacon lights, weather signal devices, and facilities for communication between the terminal fields. The terminal fields are not included in the word "airway" as used by the air mails, and the airway does not come in actual contact with operations except when landings are necessary at emergency fields.

Equipment in Commercial Operations

It can be safely stated that the fundamental engineering principles of aeronautics are now definitely defined, and that there is ample engineering information available in this country to design and build an airplane for almost any purpose. In commercial design, however, there has been very little practical application of such knowledge.

During the past year several manufacturers have designed and built planes for the Air Mail Service, which were perhaps the first commercial planes of any consequence to be designed and built in this country. The individual ideas of the designers are quite apparent in these planes, just as the individual ideas of the automobile designers were reflected in their products of fifteen years ago. It seems reasonable to think that airplane designers will eventually incorporate all such good features into one design.

It is the author's opinion that it is vastly more difficult to design and build a satisfactory commercial plane than it is to evolve a military plane. In military work the needs of the service are already quite well defined, and distinct types of planes have been developed to meet the various require-

ments. In commercial work the needs of the service will be as varied as the requirements for motor trucks, and there is very little precedent to be guided by. It should be remembered that there were fairly good automobiles for quite a number of years before there were satisfactory trucks. To produce satisfactory commercial designs the requirements of the service in which the plane is to be used will have to be very accurately determined, and the operation and maintenance problems carefully studied. It seems safe to predict that the successful commercial operators will be those whose planes fit the service, and not those who attempt to fit the service to the plane.

New types of commercial airplanes and engines will be expensive until they are produced in quantities—probably not much less than $10,000 each for planes or engines, until quantity production is reached. Liberty engines will probably be used to start commercial operations as there are several thousand of them in storage, and their cost is only about 20 per cent of that of new engines. However, Liberty engines do not adapt themselves to good airplane design, and sooner they can be disposed of the faster aviation will advance. The more modern military planes are already equipped with other engines than the Liberty, and several of the engine manufacturers are now offering some excellent new types of engines.

There is every reason to believe that future commercial airplanes will use engines of larger horsepowers. The larger engine does not cost so much per horsepower, and the cost of maintenance in service is practically the same as for a smaller engine. The pilot's pay is the same whether flying a high-powered or a low-powered plane. The cost of fuel and oil for 400-h.p. Liberty engines in mail planes is only 6.78 cents per mile, a small item as compared to the total cost of operation, which is about a dollar per mile in the government service.

With an 800-h.p. engine it is possible to design a commercial plane that will carry a ton of cargo at a cruising speed in excess of 100 m.p.h. using only 65 per cent of the rated h.p. of the engine, thereby assuring its reliability and long life. A large percentage of the mechanical difficulties that are now encountered will be eliminated when planes are designed to use ordinarily only a reasonable portion of the rated horsepower of the engine and to have ample surplus in reserve for emergencies.

Single-Engined vs. Three-Engined Planes

It is a moot point whether the plane of the future will be single-engined or three-engined. In the case of the three-engined plane there should be enough power with one engine out of commission for the plane to complete its trip or at least proceed to a safe landing place. But in the case of the three-engined plane there are necessarily three ignition systems, three carburation systems, three lubrication systems, either three fuel systems or one rather complicated one, and three times as many small mechanical parts to be replaced and maintained in service. There is, therefore, three times as much chance of engine failure with three engines as there is with one engine. Some pilots seem to think there is an even greater chance of engine failure on account of the greater number of instruments, controls, etc., that must be attended to. This is especially so where there is only one pilot to fly the ship and when most of his attention may be required in picking his course under bad weather conditions. There is an additional drag caused by the frontal area presented by multiple engines and a reduction in plane maneuverability by the distribution of the power-plant weights at some distance from the center. In view of these disadvantages and in view of the fact that engine reliability is always improving, there is

reason to believe that eventually a single-engined plane will be considered sufficiently reliable for commercial operation.

Safety in Flying

The records of the Air Mail Service in this respect are interesting. During the past four years the Service has averaged one fatal accident for each two million miles of day flying. Since night flying was started eighteen months ago, there have been two fatal accidents in over a million miles of night flying. Of the last fatal accidents in day flying, two were caused by bad weather, which the pilot encountered unexpectedly, one was a case of mechanical failure, and one was an error in judgment of pilot. In the night operations both accidents were caused by bad weather being unexpectedly encountered. Night flying on a regular schedule is still in an experimental stage and the pilots who started the night schedule have encountered the most hazardous flying that ever will be attempted, but methods of reducing these hazards are being found almost daily.

Probable Costs in Commercial Operation

Prospective commercial operators should not be concerned about the cost of government operation or the deliberate action of the government in providing modern flying equipment. Competitive bidding in securing airplane supplies and materials is a serious drawback to the progress of government aviation, and it is very costly as a large percentage of the materials secured by competitive bidding are not the most suitable for airplane operation. The commercial operator will not be so encumbered and will also be better situated in selecting experienced personnel to build an organization.

For these and other reasons it is believed that commercial operation will be much more economical than government operation. In fact, one of the large commercial companies has already published statistics which indicate its operation costs at 50 per cent less than those under government operation, even though it is using a more expensive type of plane.

The indications are that with modern equipment and an efficient business organization, airplanes equipped with engines up to 1,000 h.p. and carrying a ton of cargo at speeds from 90 to 110 m.p.h. can be operated for about 50 cents per mile. This estimate, however, does not include the cost of a lighted airway between terminal fields.

American Air Transportation

Aviation, 5 April, 1926.—With the coming of the spring of the present year it is impossible to be but impressed with the vast and rapid progress which has been made in the development of the airplane and air transportaiton. Twenty years ago the airplane, as we know it today, was but a dream. Yet the year 1926 will long be remembered as marking the opening of the first regular air transport system to be operated by private enterprise throughout this country.

The airplane, apart from its early development, which was of an extremely experimental nature, unfolded, up to within a few years ago, as a wartime products. Certainly the war was responsible for the rapid development of the modern airplane in all its various types and sizes. At the commencement of the war, in 1914, the belligerent nations found themseves in possession of the meagerest and most unreliable types of aircraft but, nevertheless, these were immediately put into service. Their tremendous possibilities, resultant upon that most important asset, the wide range of visibility obtained with altitude, was fully appreciated.

As airplane design, and the knowledge thereof, developed, the load carrypossibilities of aircraft, in addition to speed, became further appreciated,

and this, very naturally, led to the commencement of long range bombing expeditions being undertaken. It is, therefore, not surprising that at the immediate close of the war, people began to turn their attention to the possibilities of the rapid transportation of heavy loads, whether of passengers or of mail and freight, in airplanes over considerable distances and at speeds greatly in excess of those possible in the already existing forms of travel.

Nor was this tendency anything to be wondered at, since, with all the numerous inventions of the present day, none may be considered to have been successful unless capable of application to the economic and useful service of mankind. And especially so is it in the case of transportation developments. The whole political and economic growth of a nation may well be attributed very largely to the development of adequate transportation systems by which its inhabitants may inter-communicate and exchange transactions with each other.

While aviation, as a whole, was greatly furthered in development by the advent of the war, nevertheless, in many respects this belligerent period may well be considered to have influenced this development somewhat adversely. During the stresses of the period, improvement in aircraft—increases in performance—were gained very largely by the simple expedient of the addition of more power to airplanes. There is no doubt that tremendous strides in aerodynamic development were made but the tendency to obtain speed as a direct result of added horsepower was very prevalent, with the result that the close of the war found the general impression of a good single place airplane as a machine of extremely light structural weight and comparatively small dimensions but equipped with an engine of the highest power it was possible to find in a single unit. Such can hardly be termed a really sound engineering proposition. It has taken considerable time to break down the tendency and to commence development along lines of pure efficiency and economy such that the airplane may be put to useful everyday service upon a thorough business basis.

That this period of carefully guided progress and unfoldment has now reached a stage when its results have brought aviation into the realm of a reliable and valuable form of transportation is characterized by the extensive air mail routes throughout the country, the operations of which have been let to contractors by the U. S. Postoffice Department. The operation of these services will call for the application of not only the best engineering genius but also of the best operative organizations. With the opening of the numerous services, undoubtedly the major question and the only one which will receive complete attention from the outset will be the successful carrying out of the contract and the reliable operation of the service in such a manner as not only to fulfill schedule but also to instill confidence in the minds of the respective sections of the public served.

The successful operation of any air transportation service will depend not only upon adequate organization but also upon the adoption of the most suitable equipment. Undoubtedly considerable attention has been given to this all-important question and, as experience is gained, changes may be made and services improved steadily with the advancement in general understanding of the types of service required. The problem of transportation by air is developing into such an art that there is likelihood that the trunk air routes of the future will call for the employment of specialized airplanes over different parts of the same route, depending upon the length of any particular leg and the natural characteristics of this particular section. Furthermore, the extent of the demand for the service over any particular section will govern the size of the plane employed.

These problems will all be solved in the course of general unfoldment and, in the meantime, hearty congratulations are due to those far-sighted

pioneers of American air transportation who have undertaken to pilot this vast transportation system of the future through its preliminary and juvenile stages.

International Air Navigation

Aviation, 26 April, 1926.—The spectacular growth of aircraft during the war period brought home to Europe the necessity which would arise for some sort of uniform regulations for international air navigation. A subcommittee of the Peace Conference was established shortly after the war to go into the matter and lay down regulations which could be adopted by all countries.

It is hard for an American to realize the importance of such regulations and their scope. Our country is extremely large and it is rare that we wish to cross its borders even on an extended flight. In Europe, on the other hand, one can hardly get well up in the air before crossing the boundaries of another country. The regulations necessary are partly military and partly civilian. There are areas containing military defenses which are supposedly secret and which fliers of another country are not supposed to fly over. There are regulations to cover the flying of military planes over the territory of a neighboring state.

At the time of the Armistice and Peace Conference, when the main outlines of the Air Convention were drawn, the military phases perhaps predominated, but, even from the civilian viewpoint, certain regulations were necessary.

Planes could not be allowed to land or fly over a country unless they bore identification marks. Otherwise the whole system of custom and emigration laws would break down. A uniformity of markings, and regulations as to methods of landing fields, right of way in the air, lights for night flying, etc., were essential. To the air enthusiast, many of the regulations in the convention relating to international air legislation may seem irksome but actually, when flying from one country to another, it was a case of having detailed regulations or else of eliminating international flying. Some day national boundaries may not be the bar to intercommunication that they now are, but, until that day arrives, uniform regulation for all countries is better than each state having its own particular methods of controlling fliers who come from other countries.

Canada has been most lenient and helpful in allowing American planes to fly over its territory. Canada has signed the Air Convention. Some day they may wish to discourage American airplanes and they have a right to do so. The International Air Navigation Convention came up before the Senate in 1919 and it has been lying dormant there ever since. In the mean time, the signatories to the convention, through their permanent committee, are modifying and improving the regulations. This is a task in which the United States should have a part and it is to be hoped that the Senate will again take the matter up.

The Senate apparently feels that ratifying the International Air Convention might be getting us tangled up with the League of Nations and so it has carefully avoided bringing up any discussion on the convention. The House has, however, had the good sense to realize that, at some time which may not be so far in the future, air travel between the United States and Europe and South America might be a matter of common occurrence and that it would be well to frame the civil aeronautic regulations so that they would coincide in the general way with the international regulations on the subject. At present, this country treats flying boats going to the West Indies or Cuba in the same manner as it treats ocean going steamers. The ocean laws are extremely ancient and complicated and apply to voyages which

could last for months. A pilot flying alone from the United States to Cuba now has to swear solemnly that none of the crew died on the journey. This is really rather absurd and should be remedied.

London-Capetown-London by Air

Aviation, 19 April, 1926.—Very little has been said in the columns of *Aviation* relating to the very significant flight of the well-known British aviator, Alan J. Cobham, from London to Capetown and back. With this notable long distance flight now completed, it becomes opportune to discuss the general features of the undertaking since the successful conclusion thereof represents a very notable achievement.

The flight, which commenced on November 16 from London, was undertaken by Alan Cobham primarily as a survey project in connection with proposals for the operation of an air service over the route to Cape Town by Imperial Airways, Ltd. Accompanying Cobham were A. B. Elliott, the mechanic and a moving picture operator. The flight was undertaken in a *D.H.50J* airplane, equipped with a Siddeley Jaguar radial air-cooled engine, rated at 385 h.p. The machine is a small closed cabin 4-passenger and pilot plane of very sound design and sturdy construction, possessing outstanding flying qualities.

The entire flight is notable in view of the wide changes in climate which were met with and contended. The damp foggy weather of northern and central Europe and the ever increasing heat as the flight on the outward bound journey continued south, until the equator itself was crossed, all offered their respective trials to the fliers. Furthermore, when it is realized that no very special ground arrangements were made over the route, mainly because such were impossible over the major portion of the journey through the tropical jungles of Africa, the real significance of the flight may be gathered.

The entire flight was filled with notable events ranging from the appearance of wonderfully picturesque views which were photographed, to narrow and hair-breadth escapes through which the party came, largely and mainly as a result of Cobham's super skill as a cross-country pilot. It will be remembered that it was Alan Cobham who successfully flew Air Vice Marshall Sir Sefton Brancker, the Director of Civil Aviation in the British Air Ministry, to Rangoon and back to London last year, in the same machine, before the Siddeley Puma engine, with which it was then fitted, was changed for the Jaguar.

In general, the entire flight was without untoward incident, with the exception that, during the early stages of the journey, some engine trouble was experienced which actually appeared to be more as a result of incorrect fuel supplies than anything radically deficient in the engine itself. When it is remembered that the entire flight, after leaving Europe, where most of the trouble occurred on the outward journey, was successfully accomplished without any serious failures, it speaks well for all factors concerned, both personnel and mechanical. One of the most significant features, from the mechanical standpoint, is, undoubtedly, the fact that the engine—an air-cooled type—functioned, and therefore cooled well, under the stringent conditions of tropical heat flown through. The heat on some occasions was so great that to touch the wing fabric with the hand would have meant burning one's fingers.

The course of the entire outward and return flight may be followed with the aid of the map. The following are the dates of the various stages of the flight.

November.—16—London—Paris, 17—Paris—Marseilles, 18—Marseilles—Pisa, 19—Pisa—Brindisi, 20—Brindisi—Athens. 1,765 miles. (Here there

was a delay of sixteen days, caused by replacing damaged pistons in the engine.)

December.—6—Athens—Sollum, 7—Sollum—Cairo. (Hence there was a delay of nine days, while arrangements were made for benzol supplies to be send up country.)

16—Cairo—Luxor, 18—Luxor—Aswan, 20—Aswan—Wadi Halfa, 22—Wadi Halfa—Khartoum. (Here there was a further delay of six days while benzol supplies were arranged.)

28—Khartoum—Malakal. 4,185 miles.

January.—1—Malakal—Mongalla. (Here another wait of ten days was necessary while benzol was reaching the aerodromes ahead.)

11—Bongalla—Jinja, 13—Jinja—Kisumu, 18—Kisumu—Tabora, 19—Tabora—Abercorn, 20—Abercorn—N'Dola, 23—N'Dola—Broken Hill, 29—Broken Hill—Livingstone, 31—Livingstone—Bulawayo. 6,670 miles.

February.—2—Bulawayo—Palpye Road—Pretoria, 5—Pretoria—Johannesburg. (Here a delay of ten days occured because of Mr. Elliott was taken ill with malaria.)

15—Johannesburg—Kimberly, 17—Kimberly—Beaufort West—Cape Town. 8,020 miles.

Return Journey:

February.—26—Cape Town—Beaufort West—Kimberly (320 miles).
27—Kimberly—Palapye Road—Bulawayo (830 miles).
28—Bulawayo—Broken Hill—N'Dola (216 miles).
March.—2—N'Dola—Abercorn (345 miles).
3—Abercorn—Tabora—Kisumu (400 miles).
4—Kisumu—Mongalla—Malakal (815 miles).
5—Malakal—Khartoum (330 miles).
6—Khartoum—Bara—Wadi Halfa—Aswan (480 miles).
7—Aswan—Cairo (480 miles).
9—Cairo—Sollum (390 miles).
11—Sollum—Athens (450 miles).
12—Athens—Brindisi—Pisa (830 miles).
13—Pisa—Lyon—London (925 miles).

Total outward and return journey—16,130 miles. The flying time for the 8,000 and odd miles of the homeward trip was 80 hours.

Commercial Speeds of 300 M.P.H.

Aviation, 12 April, 1926.—One of the most fascinating fields for aeronautical prediction is the possible development of high flying planes for commercial use. For long distance flights, greater speed, clearer weather, and favoring winds could be obtained, but the problems to be met are many.

Flying at 50,000 ft., an air-tight cabin with normal ground atmospheric pressure inside would have to withstand a bursting force of 13.01 lb. per sq. in. By making a cylindrical cabin of a diameter of 8 ft., with semi-spherical ends, so that all parts were in tension, a safety factor of four could be obtained by using sheet duralumin of a thickness of .0694 in. As such thicknesses are common practice in flying boat hull construction, it is fairly obvious that weight would not be prohibitive.

By using a wind driven air pump, normal pressure could be maintained in the cabin and fresh air supplied. Temperatures at 50,000 ft., vary from about 130 deg. Fahrenheit, at the equator to—70 deg. Fahrenheit, in the temperate zones. The compressed air from the supercharger would be heated and, with the exhaust heat and insulation possibilities, the cabin could easily be kept warm.

At 50,000 ft., the air has about 1/6 the ground density, and the plane would have to travel at 2.56 times ground sped to maintain itself in the

air. Although the lift/drag ratio remains the same, the plane would have to travel forward 2.56 times as far in a given time to stay in the air and, thus, would require 2.56 times the power necessary to keep it in the air at ground level. However, to attain the same high speed at ground level would require about fifteen times the power. The power loading would, of necessity, be very low, a fact which is probably the most serious problem from the commercial standpoint, as it limits both the length of the flight and the useful load.

The most difficult problem to be tackled is getting and delivering the power at these altitudes. Fortunately for the advancement of aviation, McCook Field has been doing an immense amount of work along these lines. The super-charger has been developed to a point where it ceases to be fantastic to claim that full power will ultimately be developed at 50,000 ft. McCook Field engineers have built propellors of great diameter and area, they have built variable pitch propellers and, perhaps equally important, they have built and applied to airplanes a change gear mechanism so that a geared propellor can become a direct drive propeller.

Little is known about wind condition at very great heights, but, from existing knowledge, it can safely be said that, between 30,000 ft. and 60,000 ft., favorable or neutral winds can be found if the course can be varied from southern to northern routes. In the region of the trade winds, for example, five different general layers of wind direction have been noted. These altitude winds are much more regular than the surface winds, and their velocity is higher though not as high as pupularity supposed.

There are many problems, both minor and major, which must be solved individually before flying at great altitudes is really practical, but there is no reason to believe that these will not be solved within the next generation. Supper in New York and breakfast in Paris is our motto.

On Fuels for Aircraft Engines

Aviation, 26 April, 1926.—With the extended and increasing use of the Wright Whirlwind radial air-cooled engine for commercial purposes, it is of very first importance that every attention and care should be given to certain fine points in maintenance upon which success lies. Very excellent results, from the standpoint of reliability in operation, have been obtained in the use of the Whirlwind engine in both naval and commercial airplanes and, since the use of this type of engine is still extending rapidly, it seems wise to take this opportunity of discussing what is probably one of the most important features requiring attention from the standpoint of reliability.

Reliable though an airplane engine may be, it is always reasonable that, to obtain the full measure of this reliability, every attention should be given to certain stipulated requirements laid down by the manufacturers of the particular engine in question. One of the most emphatic requirements which almost any manufacturer of engines will state is that gasoline of the best quality be used exclusively in the running of the engine. A booklet is issued by the Wright Aeronautical Corporation relating to the operation of Wright engines and, in this, there appears a special section on the correct fuel to be employed for obtaining the best results.

If the stipulations laid down were particularly stringent, there might be some excuse for a certain amount of laxity on the part of operators, but since the best advice that the Whirlwind manufacturers can offer on this question of fuel, is that ordinary domestic aviation gasoline, or its equivalent be used exclusively in the engine, there can never be any excuse for neglect in this respect. The Wright Whirlwind engine is specifically designed to run on domestic aviation gasoline, commonly known as high-test gasoline, and

the compression ratio is considerably too high to allow satisfactory running with common commercial or automobile gasoline. The use of inferior fuels such as commercial gasoline, leads to overheating of the cylinders and, consequently, to a great reduction in the life of cylinders, pistons, and valves. The reliability and durability of the engine, which is of the very first order when correct fuel is used, will very naturally be considerably reduced by the use of inferior gasoline.

The use of inferior fuel also means hard starting and oil dilution with the consequent danger of scoring cylinders, piston rings, and pistons. The power output is reduced and the tendency to detonation greatly increased. The importance of these points cannot be over-emphasized and every commercial user of Whirlwind engines, or any other engine for that matter, should give careful attention to his gasoline supply to see that it meets the requirements of reliable operation, which, in the long run, means all that there is to economy and success. When it is realized that the excellent guarantee which accompanies all new Wright engines is immediately rendered nul and void as soon as the engine is run on commercial or other inferior fuel, the real importance of this problem will be even further recognized.

Quality Tests for Gasoline

Elaborating upon this question of the correct fuel for aircraft engines, the following note extracted from the Wright engine instruction book, contains some valuable advice:

> "Wright aircraft engines are designed for use with domestic aviation gasoline or its equivalent, and the use of any inferior fuel voids our guarantee. All Wright engines are tested at the factory with domestic aviation gasoline which has been analyzed and tested to meet Navy specification 7G1B for grade B domestic aviation gasoline. Commercial flying concerns using gasoline in considerable quantities are advised to insist on a gasoline equal in quality to this specification, which may be determined by subjecting gasoline samples from every lot purchased to a number of tests in which they should meet the following specifications:
>
> 1) Free from water and suspended matter.
> 2) Color not darker than No. 25 Saybolt.
> 3) Negative doctor test.
> 4) No gray or black corrosion from 100 cc. sample and not more than 3 mg. deposit when evaporated in a polished copper dish.
> 5) Distillation range temperature limits:—
> a. At recovery of 5% of sample—75°C (167°F) to 50°C (122°F)
> b. At recovery of 50% of sample—not more than 105°C (221°F)
> c. At recovery of 90% of sample—not more than 155°C (311°F)
> d. At recovery of 96% of sample—not more than 175°C (347°F)
> At least 96 per cent shall be recovered as distillate.
> When residue in flask is cooled and added to distillate, loss shall not exceed 2 per cent.
> 6) No acid reaction of residue in flask at completion of distillation.
> 7) Not over 0.10 per cent sulphur in sample.
>
> There is no objection to a use of a good quality of benzol to suppress the detonation in gasolines which have a tendency to produce detonation.

Of course, it is perfectly possible to design an engine which would run on automobile gasoline, but the average operator would not be pleased with the power output, either in relation to weight or to the overall dimensions of the engine. Furthermore, there is no good reason for using commercial gasoline in aircraft engines at this time, and the best advice suggests that

it be always avoided. If, however, under peculiarly adverse circumstances, when emergency is in the extreme and commercial gasoline is all that is available, the user should most certainly fly with the engine continually throttled as far as possible in order to prevent the overheating of the cylinders.

The Bristol Cherub Air-Cooled Engine

Aviation, 12 April, 1926.—As a result of the successes of the original Cherub engine in the 1924 and 1925 Lympue Light Airplane Competitions, the Bristol Aeroplane Company of England decided to develop this engine further, with the idea of putting it on a basis equal to the best modern large aircraft engines as regards reliability and performance. As a result of extensive work, the Series III engine has been developed.

In the re-designing of the Cherub Series III engine, there has been provided a more robust crankcase, a full-floating big end bearing, full pressure system, dry sump and double spur gear pump. The capacity has been increased to 1,228 cu. cm. and a new type of carburator and double ignition have been fitted.

The engine has recently been submitted successfully to the late British Air Ministry 100-hr. Type tests. It completed this test in ten non-stop periods of 10 hr. each, without any hitch, stoppage, adjustments, or replacements. On the last hour, the engine held 36.6 b.hp. at 3200 r.p.m.. The average fuel consumption throughout the test was .586 pints per b.hp. per hr. and the average oil consumption .026 pints per b.hp. per hr. At the conclusion of the test, the engine was stripped and found to be generally in excellent condition.

The Bristol Cherub engine is of the two-cylinder opposed type and has a total swept volume of just under 1230 cu. cms.

The crankshaft is a case-hardened alloy steel stamping of ample dimensions, carried in four bearings; the crankcase is an aluminum casting, split vertically on the engine center line and provided with separate front and rear covers.

There are three main journal bearings. The front one is of the deep groove type, located in the nose of the conical front cover, and transmits the propeller thrust from the crankshaft to the case. The other two are of the double row self-aligning type, and situated adjacent to the crank throws, one in front and the other in behind, and are housed in the front and rear half crankcase, respectively. The tail end of the shaft is supported in the rear corner by a plain white metal bearing which provides an oil seal, allowing oil to be supplied through the hollow tail end and drilled oilways to the big end of the bearings. On the shaft between the two rear bearings, a spur wheel and two spiral gear wheels provide drives for the crankshaft, tachometer and magneto and oil pump, respectively.

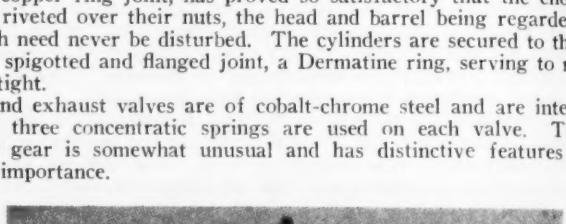
Connecting rods are alloy steel forgings with hardened liners, pressed into the big ends, the proportions of which are such that the rods may be threaded over the shaft. When in position, the split bronze floating bushes are inserted and the two halves secured to each other by high tensile steel screws which are locked by split pins.

The pistons are of aluminum alloy, fitted with three rings, the lower one of which serves as a scraper and returns surplus oil from the cylinder walls through drain holes in the piston skirt. The hollow gudgeon pins float, both in the piston bosses and in the connecting rod small ends and are located endways by bronze buttons pressed into their open ends.

The cylinders have steel barrels, but the inlet and exhaust passages are formed in the aluminum alloy heads which also carry the screwed-in alloy steel valve seats, valve guides, valves, and springs. A deep spigot for the

head is provided on the barrel with a flange to which the head is bolted by a copper ring spigotted and very carefully fitted in annular grooves cut in the head and barrel flanges. As the rates of expansion of aluminum and steel are different, great difficulty is usually encountered in the maintenance of a really gas-tight joint with this type of head. In the Cherub heads, this difficulty has been entirely overcome by inserting packing pieces of a special alloy, having an unusually low rate of expansion, between the cylinder heads and the heads of securing bolts. This arrangement, combined with the copper ring joint, has proved so satisfactory that the ends of the bolts are riveted over their nuts, the head and barrel being regarded as one unit which need never be disturbed. The cylinders are secured to the crankcase by a spigotted and flanged joint, a Dermatine ring, serving to make the joint oil tight.

Inlet and exhaust valves are of cobalt-chrome steel and are interchangeable, and three concentratic springs are used on each valve. The valve operating gear is somewhat unusual and has distinctive features of considerable importance.



THE BRISTOL CHERUB ENGINE SEEN FROM THE REAR

The camshaft, which, with its four cams is machined from the solid, runs across the crankcase below the crankshaft and is driven by plain spur gears of ample dimensions. The cams are of the constant acceleration type. The valves are operated by rocker shafts which run parallel to the cylinder axes from crankcase to cylinder head. These may be regarded as the precise equivalent of the normal type of rocker arm which is interposed between camshaft and valve in the overhead camshaft type of engine, with a single difference that a rocker, which is operated through a finger, by the cams, is separated from that which operates the valves by a length of shafting. As the valve stems project from the cylinder heads radially relative to the cylinder bore, any difference between the expansion of the cylinder and that of the rocker shaft merely moves the valve stem slightly across the face of the operating rocker, but does not alter the valve clearance. A torsion spring fitted to the rocker shaft keeps the cams, finger, and operated rocker in contact and the whole valve gear is entirely enclosed.

As already mentioned, the magneto is driven by spiral gears from the rear end of the crankshaft. It is mounted on the rear cover by a flange

and spigot and lies behind and parallel to the port side cylinder with the contact breaker readily accessible. The magneto is a double pole double slip ring type which fires two plugs in each cylinder. It is fitted with an impulse starter to render starting easy.

The oil pump is located behind the starboard cylinder in an extension of the magneto housing on the rear cover where it also is readily accessible, and is driven by the same spiral gears that drive the magneto. It is detachable as a complete unit and consists of two independent gear pumps. At the bottom of the crankcase is provided a detachable oil pump containing an easily removable oil filter. The larger of the two pumps draws oil drained from the crankcase through this filter and returns it to the tank, via a filter in the bulkhead, and supplies it, under pressure, through drilled oilways to the big end bearings and the brushed bearings of the camshaft and intermediate wheel. This pump is provided with a spring loaded pressure adjuster, the bypassed oil being returned to the suction side of the pump. The spiral gears are adequately lubricated by oil collected in a well into which the lower gear dips. The bearings of this gear are automatically lubricated by the oil which flows from a similar but smaller well, special provision being bade to prevent leakage through this bearing into the magneto housing.

The carburetor is a special type of Zenith with hand operated altitude control of the extra diffuser air type and is bolted to a cast aluminum induction T-piece which is attached by studs and nuts to a broad facing on the underside of the magneto and pump housing on the rear cover. The throttle and magneto advance and retard are inter-connected by a suitable arrangement of levers and links. The altitude control is independent except that it is closed automatically if the throttle is closed. The air intake to the carburetor is an exhaust jacketted steel elbow. The induction pipes run from the T-piece parallel to the cylinders and are fitted into it with airtight expansion joints, and are provided with bosses to take primer jets.

The engine is mounted from screwed extensions on the ends of the four crankcase bolts at each corner of the crankcase.

A standard connection or a tachometer is arranged on the port side, above the magneto.

Characteristics

The general characteristics of the engine are as follows:

Type	Air cooled horizontally opposed twin.
Cylinders	Aluminum head.
	Overhead valves.
Bore and Stroke	3.54″ x 3.80″.
	90 m.m. x 96.5 m.m.
Total stroke volume	75 cu. in.
	1228 c. cs.
Compression rates	5.5 to 1.
Power at normal r.p.m.	33 b.hp. at 2900 r.p.m.
Power at maximum r.p.m.	36 b.hp. at 3200 r.p.m.
Propeller	Direct drive L.H. Tractor.
Lubrication system	Pressure 40 lb./sq. in.
Oil pump	Duplex gear 1 scavenge 1 pressure.
Carburetor	1 Special Zenith aero model.
Altitude control	Hand operated extra air to diffuser.
Ignition	Dual. Double pole H.T. magneto.
Sparking plugs	2 per cylinder K.L.G. 14 m.m.
Starter gear	Impulse starter on magneto.
Weight dry	95 lb.

Fuel consumption per hour .....2 gal.
Oil consumption per hour .....1 pt.
Fuel recommended ....60 per cent Gasoline, 40 per cent Benzol.

U. S. Navy's Aircraft Method Commended

By Hector C. Bywater, The Baltimore *Sun*, 20 April.—London, April 2.—Only one ship in the British Navy is equipped with a catapult for launching airplanes, according to an item in the new naval budget. This vessel is the *Vindictive*, begun during the war as a cruiser, converted into an aircraft-carrier while building, and since restored to her original design.

By way of contrast, the American Navy appears to have most of its major vessels fitted with catapults and the provision of ship-borne aircraft is on a much more liberal scale than in the British service. Reports from Washington indicate that 500 planes will be operating with the United States fleet during the present year, including 224 of the latest construction. The British total is considerably smaller.

We are told, further, that American warships of every type are provided with airplanes, each battleship having one scouting and two combat planes and each cruiser two scouting machines. Eighteen American destroyers are said to carry a combat plane apiece and nine submarines are fitted for the transport of a miniature scouting plane.

If these reports are true they leave no doubt as to the long lead which the American fleet has gained in the development of this particular branch of aviation. The British system hitherto has been to concentrate the air power of the fleet in ships specially built for the purpose, with the result that this country now has six effective carriers already in service or fitting out.

It is true that they are inferior in size, capacity, and speed to the latest American and Japanese carriers, but collectively they form a squadron to which there is no counterpart in any other navy. The rule of concentration is followed so rigidly that the practice of carrying airplanes in battleships, introduced during the war, seems to have been abandoned. In recently published photographs of the British fleet at sea no aircraft is visible on board of any of the battleships or cruisers, though some of the latter have hangars or launching platforms.

It may be that the supply of machines and pilots is insufficient to provide aviation units for any ships other than the aircraft carriers. Contrary to what is often asserted in American papers, the air work of the British Navy is seriously hampered both by lack of funds and by the control exercised over it by the Royal Air Force, which supplies all the material and trains the personnel of the flying branch.

So far as the navy is concerned, the worst evils—and they are manifold and obvious—of the unified air service have been mitigated by the application of common sense.

Until recently, for instance, enlisted men belonging to the Royal Air Force were drafted to naval aircraft carriers. These men had no duties apart from aviation, and since flying operations were carried out only from time to time they were, to all intents, mere passengers for the greater part of the time. Knowing nothing of seamanship they could take no part in the ordinary duties of shipboard routine. This anomalous state of affairs has now been remedied, the Royal Air Force "aircraftsmen" have been replaced by bluejackets.

But other drawbacks inseparable from a unified air command still remain and unquestionably tend to retard the progress of aviation in the British Navy. I venture to say that American champions of a composite avia-

tion corps would soon find reason to moderate their enthusiasm if they studied the practical consequences of the system as applied to the British Navy.

On the wider question of the distribution of naval air power, I think a strong case can be made out for the American method of allotting planes to every ship capable of carrying them, as opposed to the British Navy's system of transporting the whole, or at any rate the great majority, of its naval aircraft in a few special ships.

Nothing is more certain than that these ships will be singled out for attack by the enemy, who will know full well that if he contrives to sink or disable them he will have virtually blinded his adversary. Aircraft carriers are peculiarly vulnerable to attack. In proportion to tonnage they are very lightly armed; their armor protection is much inferior to that of the battleship, and their spacious flight decks offer an inviting target to bombs.

That they will be crippled in the early phases of a fight seems more than likely, and with the carriers properly placed *hors de combat* the struggle for air mastery, which promises to be the decisive factor in the future naval action, will be left to machines flown off other ships of the contending fleets.

Hence the value to the American Navy of the numerous planes with which its capital ships, cruisers, and even its destroyers, are equipped. If eighteen battleships have three machines apiece and ten cruisers two apiece, the fleet will be able to send up seventy-four planes above and beyond those launched from the aircraft carriers.

Moreover, these seventy-four independent planes will be always with the fleet and ready for immediate action, whereas the carriers may be absent just at the critical moment when a strong air offensive or defensive deployment is vital to the fortunes of the day. Here, however, I find that I am merely repeating the cogent argument which Captain Dudley Knox, U. S. N., propounded in the *Sun* last December to support his eminently rational view that aviation material should be distributed among the fleet as a whole instead of being confined exclusively to the aircraft carriers.

Few people who have delved into the matter at all seriously are prepared to maintain that the naval wars of tomorrow will be fought and won by airpower alone. Fewer still, however, are prepared to deny that aircraft have become an indispensable element of naval force.

Overmuch attention has perhaps been given to their offensive powers as bombers and torpedoists. Their infinitely greater value as "the eyes of the fleet" is less evident to lay opinion than it is to naval men. When the armored cruiser was evolved a generation ago its inception was justified on the ground that "armor means vision and vision means victory." This was a short way of saying that the new cruisers, thanks to their protective belts, would be able to reconnoiter the enemy at close range, thus obtaining accurate information as to his strength and grouping.

But for any such purpose the airplane is immeasurably superior. It can cover six miles to the cruiser's one; it has a far broader range of vision; it is less easy to drive off, and if it should be destroyed its loss is not a catastrophe. Where the cruiser used to scout ten miles ahead of the fleet, the airplane can scout 100 miles ahead. Smoke screens put up by the enemy may baffle observation by surface ships, but they are of little avail against the argus-eyed spies of the sky.

If vision still means victory—and, other things being equal, there is small doubt that it does—the fleet that is adequately provided with aircraft *available under all circumstances* will go into battle with the brighest prospects of winning. To centralize all air power in a small group of conspicuous and easily disabled ships seems the part of unwisdom. In warfare as in other ventures it is never safe to put all your eggs in one basket.

Military Aviation

New York *Times*, 25 April, 1926—The programs for the expansion of the aviation branches of our Army and Navy call for the expenditure of $235,000,000 during the next five years. The reason is to be found in Europe. France is the key to the international military aviation situation, but she considers her great air force justified. Her present dominance of the air is spurring England to vast expenditure in the effort to attain something approaching parity with her neighbor across the channel.

At the end of the war England had enormous power in the air, a personnel of 300,000 devoted to this branch of fighting alone. But she thought that war and excessive preparation for it were over. So she did heroic work in scrapping and reducing her aviation arm. Then England awoke to the fact that France was overwhelmingly superior in the air; for France had not reduced to anything like the degree that England had. "Aviation and tanks" was the French program for 1919 and aviation and tanks it has remained. That is why England will spend $80,000,000 on military aviation this year.

She now has a personnel of 35,000, possibly a trifle larger than that of France. She plans 600 first-line planes for home defense and 600 in reserve. Our around-the-world fliers reported that they found in the Middle and Far East a British Air Force equal to the total air force of our own army. Armored airdromes have been constructed around London and raid-proof zones to protect other important centers. Great improvement has been made in wireless telephony between planes, and between planes and the ground. Control of pilotless planes by radio has been steadily extended.

England has one type of seaplane which has two 1,000-horsepower engines and which, when loaded, weighs fifteen tons. She has another seaplane which has three 700-horsepower engines and which will accommodate thirty men. She is building fifteen planes each of which will carry more than twenty soldiers, their equipment, and bombs and gases is desired. In Iraq, not long since, British troops were transported by air "to quell a disturbance," in eight hours, while any other means of transport in this emergency would have required four and a half days.

Two dirigibles, of 5,000,000 cubic feet, are being constructed in England, one by the government, one by a private company. They are designed primarily for determining the practicability of commercial air service to Egypt, India, and Australia. It is expected that they will arrive at Australia in eleven days as against the six weeks required by steamships at present. But their military value will also be carefully studied. Their designs show a breaking away from the wartime Zeppelin. One feature evolved by English engineers is the detachable machinery car. With the ship moored to a mast, the car may be detached as is a locomotive from a railway train, and with reserve engine units as bases possible delays due to engine trouble may be largely overcome.

The two dirigibles included in our naval aviation program will be even larger than England's, and they will be frankly military in character. They will mount seven of the new Browning 50-caliber machine guns and several smaller machine guns as well. But another war will be required to determine the offensive value of the fast-developing dirigible.

The development of military aviation since the war has been enormous. Is it to continue indefinitely? The general problem of limiting or reducing armaments contains no more involved or important subsidiary than this question of the airplane.

ENGINEERING

Shipping Board Completes Tests on First of the Large Diesels on Order

Power, 6 April, 1926.—On March 6 the Shipping Board inspectors finished the official tests on the first of the large Diesel engines contracted for by the board, this being a 2,900-h.p. double-acting two-cycle engine designed and built by the Worthington Pump and Machinery Corporation. Dismantling of the engine is now in progress and it is expected that the Shipping Board will install the unit in the *Seminole.*

In embarking upon the extensive plans of changing steam-propelled cargo vessels to Diesel drive the board determined that inasmuch as this step was considered a radical one by many in marine circles, each contract for engines should embrace every feature that would guarantee that the units after entering into active maritime duty would prove economical in both fuel and lubricating oil consumption and at the same time so reliable that maintenance would be reduced to a minimum.

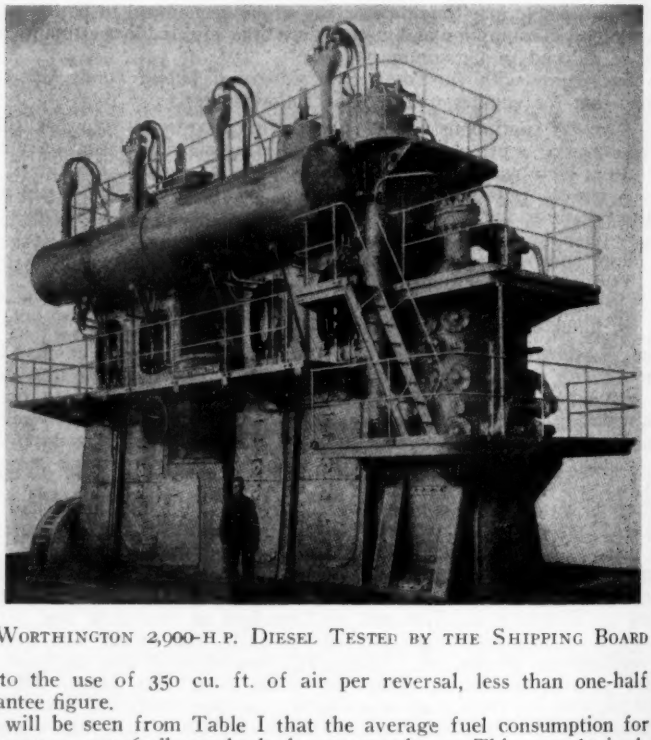
In accordance with this desire to safeguard public funds the board required that the engines undergo the following tests:

1. A 30-day continuous run at full load of 2,900 hp. at 95 r.p.m, subject to a tolerance of 1 per cent on power and an overload variation of 3 r.p.m.
2. A six-hour run at 10 per cent overload at 95 r.p.m.
3. A run of four hours with an increase of 10 per cent in the mean effective pressures and with 5 per cent increase in speed.
4. A six-hour run at three-quarters load.
5. Four hour's operating at one-half load.
6. Two hours at one-quarter load.
7. One hour at full load astern.
8. One hour of maneuvering tests.

The Worthington Diesel is a four-cylinder unit, the cylinder bore being 28 inches, with a piston stroke of 40 inches and is shown in the illustration. The outstanding feature is the use of two steel, dome-shaped forgings that go to make up the two ends of each cylinder. Into these steel sheels are placed thin cast-iron liners to take the wear due to the piston contact. This four-cylinder unit is a development of the single-cylinder engine completed about two years ago.

After the first of the engines ordered by the Shipping Board had been completed and erected on the test floor at the Buffalo works, arrangements were made to put it through the rigorous tests required by the terms of the contract. To provide a load, a 25-cycle, three-phase alternating-current generator was coupled to the engine shaft and the 30-day continuous run started on February 2. This test was finished on March 4, and without adjustment or examination of any of the parts, the 10 per cent overload was immediately thrown on. Upon the completion of this six-hour run, the engine was successively submitted to the other tests listed. The total period required for these runs was slightly for than thirty-one days of continuous operation. The data covering the 30-day run at full load appear in Table I. The engine was shut down at 5 P. M. on March 5 and left under observation but without adjustment or examination of any kind until 9:30 A. M., March 6, at which time the maneuvering tests were begun. Although the machine had stood idle for sixteen hours in the cold building, as soon as the control lever was set to the starting position the engine began firing at the first revolution, even though the fuel pumps had not been primed. The maneuvering tests, which by contract were to be for one hour only, were continued for several hours. These tests, in conjunction with the preliminary shop tests, made a total of sixty-seven days of continuous operation.

Since maneuvering ability is a prime requirement in a marine engine, the results of these tests are of more than passing moment. It was found that the time required for reversal averaged 8.55 seconds, with a minimum of but 4.8 seconds. This time is that elapsing from the moment when, with the engine at full speed in one direction, the starting lever was thrown to reverse, until combustion ensued with the engine rotating in the opposite direction. This rapidity of reversal was not due to any unusual skill of the test engineer, for the operations were performed by a number of the observers, many of whom had had no previous experience with Diesel engines. During the maneuvering twenty-three reversals were obtained with a starting tank capacity of 855 cu. ft., the pressure gradually dropping from 337 to 195 lb. Additional reversals were made until the pressure dropped to 85 lbs., the total number of reversals being forty-two. This was equivalent to the use of 350 cu. ft. of air per reversal, less than one-half the guarantee figure.



WORTHINGTON 2,900-H.P. DIESEL TESTED BY THE SHIPPING BOARD

It will be seen from Table I that the average fuel consumption for the 30-day run was 0.462 lb. per brake horsepower-hour. This was obtained with fuel oil having the following general characteristics of the Bunker "B" specifications:

Gravity, Baumé, at 60 deg. F	20.19
Flash point, deg. F	177
Burning point, deg. F	270
Viscosity, Saybolt, at 122 deg. F	181
Hydrogen, per cent	13.02
Oxygen, per cent	0.37

Carbon, per cent	85.29
Water, per cent	0.11
Asphalt, hard, per cent	5.95
Sulphur, per cent	0.37
Ash, per cent	0.08
Heat value, B.t.u. per lb.	18,733

However, the fuel received showed some variation; some was decidedly inferior, being as low as 14 deg. Baumé. The oil was not centrifuged and as a result grit was constantly working through the fuel pump and spray valves, although no ill effects resulted. The value given for the fuel consumption is subject to a correction which, it is estimated, will bring it down to approximately 0.44 lb. per b.hp.-hr. The generator was rated at 1,400 kw. and the efficiency used in determining the load on the engine was 95.1, exclusive of the excitation, this being that determined by an A.I.E.E. code test conducted by the electrical builder. However, there is no doubt that at the load carried 2,900 hp., the generator efficiency is lower than at full load, and if so, the actual engine load was higher than computed and the fuel consumption lower. Upon testing the second of the Shipping Board engines, the Worthington engineers will make an actual input-output test of the generator in order to arrive at the true engine performance. It is probable that the engine in its overload test actually exceeded a load of 3,500 hp. and that the fuel consumption at full load was not more than 0.44 lb. per brake horsepower.

Since the engine was engaged in a long-run test, no special pains were taken to reduce the lubricating oil consumption to a minimum. Still, as shown by Table I, the brake horsepower-hours per gallon of lubricating oil were 4,104.

TABLE I—30-DAY TEST ON WORTHINGTON TWO-CYCLE, DOUBLE-ACTING DIESEL

Date of Test	Feb. 2 to March 4, 1926
Location	Buffalo, N. Y.
Builder	Worthington Pump & Mach. Corp.
Test conducted by	U. S. Shipping Board
Duration of test, hours	720
Revolutions per minute, average	96.4
Total r.p.m.	4,164,952
Brake horsepower, average	2,907
Indicated horsepower, top of cylinder	558
Mean indicated pressure, lb. per sq. in.	93.2
Indicated horsepower, bottom of cylinder	450
Mean indicated pressure, lb. per sq. in.	83.7
Indicated horsepower, total	4,035
Mean indicated pressure, average	88.5
Mechanical efficiency, per cent	72.7
Air compressor indicated horsepower	187.8
Scavenging pump indicated horsepower	194
Fuel per i.hp.-hr., lb.	0.332
Fuel per b.hp.-hr., lb.	0.462
Thermal efficiency, per cent	29.6
Lubricating oil, gal. per 24 hours:	
Power cylinders	2.79
Stuffing boxes	4.25
Air compressor	0.46
Scavenging pump	0.17

Hand feeds	0.26
Crank case	7.07
Total, gal. per day	15.00
Cooling water, gal. per b.hp.-hr.	5.5
Temperatures:	
Cooling water, deg. F. to compressor	35
from compressor	40
Cooling water, deg. F. to jackets	40
from jackets	120
Cooling water, deg. F. to pistons	40
from pistons	105
Exhaust temperature, deg. F.	532
Lubricating oil, deg. F., to engine	95
from engine	96
Fuel oil, deg. F.	89
Engine room, deg. F.	68
Outside air, deg. F.	29
Compressor air temperatures:	
1 stage, deg. F. to cooler	142
from cooler	43
2 stage, deg. F. to cooler	139
from cooler	43
3 stage, deg. F. to cooler	138
from cooler	42
4 stage, deg. F. to cooler	234
from cooler	77
Pressures:	
Injection air, lb. per sq. in.	890
Standby air receiver, lb. per sq. in.	869
3 stage of compressor, lb. per sq. in.	246
2 stage of compressor, lb. per sq. in.	74
1 stage of compressor, lb. per sq. in.	24
Scavenging air, lb. per sq. in.	1 11/16
Lubricating oil, lb. per sq. in.	12
Cooling water, lb. per sq. in.	30
Barometer, in.	29.09

Interest, of course, was displayed in the probable cylinder wear. After the completion of the tests the top cylinders and pistons were removed to permit examination of liners, pistons, rings, stuffing boxes, etc. It was found that in a total of sixty-seven days of operation, the wear in the liners average 0.002 in. There was no evidence of scoring in any of the liners or pistons, the surfaces having a fine glaze. Every piston ring was free in its groove and gumming was entirely absent.

Much discussion has been centered on the question of stuffing boxes of double-acting engines. The stuffing boxes of this engine are provided with metallic packing rings, and no evidence of wear or overheating was present. The piston end is water cooled and the packing rings are exposed to no high temperatures.

In fact, by reason of the design of the piston and lower head, the stuffing-box rings are never in contact with any part of the rod previously exposed to the flames of combustion. From all appearances, the doubt often expressed as to the trouble to be expected with rod stuffing boxes can now be set at rest.

The wear on the running gear, including main journals and crankpins, was not ascertained, although inspection revealed that the wear was insignificant.

Pulverized Coal on Board Ship

The Nautical Gazette, 27 March.—Pulverized coal, which has been successfully used in electric power plants, is to be tested at the League Island Navy Yard at Philadelphia this month. The uses of pulverized coal as fuel is one of the most notable developments which has occurred in recent years in the science and practice of steam engineering on land. Therefore a paper entitled "Pulverized Fuel Firing," recently read by Mr. W. Kilburn Scott before the Institute of Marine Engineers is more than usual interest at this time.

In this process the coal is first of all ground into a fine powder and then forced into the furnace of the boiler by means of air under pressure through suitably designed nozzles, whence the coal burns in very much the same way as oil fuel. There are many obvious advantages in this system of burning coal, not the least important being that it possesses the same degree of flexibility and control as is usually associated with the use of oil fuel, and, in addition, it leads to higher efficiency, as well as a greater and steadier output of steam from a given size of boiler. The use of pulverized coal has so far made great headway in the United States and signs are not wanting that power engineers on the other side are beginning to realize the immense advantages which follow its adoption. The question will at once be asked as to the possibilities of burning pulverized coal on board ship, and, while experiments have already been undertaken with a view to testing the practicability of the process, it must be admitted that so far but little success has been achieved. There can be no doubt, however, that a further investigation of the subject might lead to the discovery of appropriate methods of overcoming the peculiar difficulties inseparable from its use in marine boilers.

Mr. Scott mentions in the course of his paper that at the Nechells Power Station, Birmingham, fuel from the pitheads is being burned, after pulverization, the calorific value of which is below 9,000 B.Th.U., the ash contained being 20 per cent and the cost being about 7 shillings per ton delivered. The cost of pulverization must, of course, be added to this figure, but this only works out at a very small sum, being estimated at between 1½ and 2½ per cent of the cost of the coal. Hence it will be realized that the cost of the fuel as fired into the boilers could be made very much cheaper than at present when steam coal of average quality is employed. One of the first experimental vessels using pulverized fuel was the U. S. naval patrol vessel *Gem*, for which the fuel was pulverized on shore before being delivered to the bunkers. The idea of pulverizing the coal on shore before supplying it to the ship has many obvious disadvantages, and the modern method would doubtless be to install pulverizers of suitable capacity on board, the low-grade fuel being bunkered in the same way as at present. This was the method employed on the Australian ship *Skylark*, and it is the method which is now being tested on a steamer plying on the Rhine in Germany. In the latter vessel the coal is pulverized by means of a unit machine which delivers the fuel to the boiler as it is prepared.

So far, the greatest difficulty when burning pulverized coal has been to obtain a furnace or combustion chamber which can stand up to the very high temperature to which it is exposed. In land boilers this difficulty is gradually being overcome by the use of very large combustion chambers having their walls either air-cooled or else protected by tubes containing water, these tubes forming an integral part of either the feed water heater, *i.e.*, the "economizer," as it is called in land practice, or else part of the water

circulation system of the boiler itself. It is, therefore, fairly certain that the ordinary form of return-tube marine boiler is not likely to prove successful when burning pulverized coal unless an entirely new and much smaller form of burner can be developed; but the author gives a hint as to the solution of the problem when he suggests that pulverized coal calls for an entirely new type of boiler designed specifically with the idea of burning coal in this particular manner. The position is very much the same on land, where the recognition of the advantages of pulverized fuel is leading to the development of boilers of an entirely new form, the principal features of the design being determined by the necessity of withstanding the conditions imposed by the use of the pulverized coal. Similarly, it should not be beyond the skill of the marine engineer to design a boiler which, while fulfilling the essential conditions of a marine boiler, should also be capable of burning pulverized coal with high efficiency and complete reliability.

High Pressure Water-tube Boilers for Marine Purposes

The Engineer, 9 April.—In submitting the present paper to the Institution of Naval Architects, an endeavor has been made to investigate the practical application of high pressures and temperatures on board ship, and to make special reference to a definite step which has been taken in introducing high-pressure boilers in a passenger steamer at present under construction.

The adoption of high pressures and temperatures on land has already made considerable progress, and just in the same way as the introduction of the steam turbine for marine purposes followed some years after its introduction on land, so it would appear that history is repeating itself in the case of high-pressure boilers. Boiler installations having steam pressures of 500 lb. to 600 lb. per square inch, and superheat temperatures of 700 deg. to 750 deg. F., are in commercial use in a number of power stations, and such pressures and temperatures may be said to have passed the experimental stage.

If, therefore, these pressures and temperatures can be adopted on land, there seems no reason why they should not likewise be adopted at sea. There are certain fundamental factors common to both, among them suitable materials and workmanship. The better and more uniform materials now in use, and the improved metallurgical and manufacturing methods now adopted, remove from the designer's mind any anxiety as to materials. Copper, wrought iron, and cast iron have been discarded in the manufacture of water-tube boilers of high pressures. Steel is in common use, and its uniformity leaves little to be desired. Certain of the non-ferrous alloys which are now used also contribute to that security which characterizes modern installations.

Workmanship must obviously be of the very highest class throughout, just in the same way as the manufacture of the Diesel engine requires the greatest skill. It may therefore be accepted that, with good materials and workmanship, no trouble should be experienced in boilers working at the pressures and temperatures mentioned above.

There is, however, one difference between land and marine practice, namely, that in the latter case there is always the risk of a leaky condenser allowing salt to enter the system, although it must be remembered that there are many electric power stations where the condensing water is by no means entirely free from salt.

The presence of salt can be detected immediately by various means, and in the navy from the time a leaky condenser tube is discovered to the time when this tube has been plugged and the installation is again under way occupies only a very short period. Sir Charles Parsons has proposed to sub-

divide the condensers, so that one of them can be isolated if a leak is discovered. Both these methods are merely remedial, but with the investigations now being carried out, such, for instance, as adopting different materials for condenser tubes, it may be assumed that this trouble will be finally overcome. It is hardly conceivable that, with the skill of the engineer and metallurgist, progress along any promising line of development will be retarded because no means can be found of keeping salt out of the feed system.

Fear has been expressed that with high temperatures and increased pressures there will be a difficulty in keeping steam joints tight, and that this will be more serious on board a vessel than in a power station, as the latter generally consists of a large open building and all joints are easily accessible. There does not seem to be any valid reason to fear this difficulty, for if proper materials and high-class workmanship are employed, steam joints can be made quite satisfactory. A suitably designed metal-to-metal joint with strong bolts and thick flanges should give no trouble. In one respect, the problem is simplified in a marine installation as compared to land boilers, because in the latter case the units are usually much larger and the valves and pipes are, in consequence, very much bigger than on board ship. For

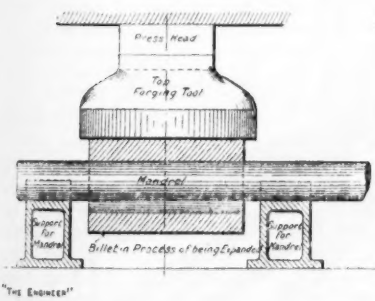


FIG. 1.—EXPANDING

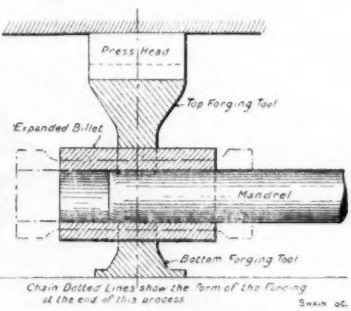

Press Head
Top Forging Tool
Expanded Billet
Mandrel
Bottom Forging Tool
Chain Dotted Lines show the form of the Forging at the end of this process
SMAIN. 26.

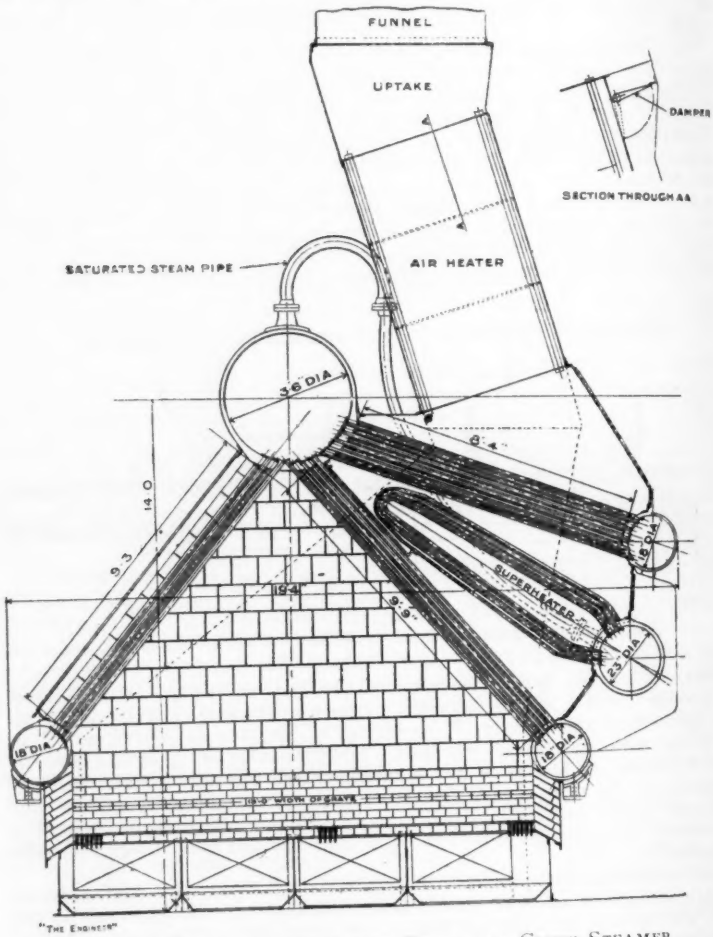
FIG. 2.—FORGING

instance, the steam pipe from each of the Yarrow boilers at the County of London Electric Supply Company's station at Barking, working at 400 lb. per square inch and 725 deg. F. superheat, has a diameter of 8 in. and joins up to the 12 in. main steam pipe line. In a steamship of 24,000 shaft horsepower, having six boilers of 575 lb. pressure and 750 deg. F. superheat, the diameter of the main steam pipe from each of the boilers would be only 4 in., and would connect into two 7 in. steam pipes in the engine-room. The valves and boiler fittings would be of smaller size and their design therefore simplified.

In considering the problem of turbine installations with high-pressure boilers, it may be assumed that a boiler efficiency of not less than 85 per cent, will be realized when air heaters are fitted, and in the case of boilers with straight and well inclined tubes, the rapid circulation of the water keeps the tubes clean, and therefore a high efficiency can be maintained over long periods of service.

It may be of interest to the meeting to give some particulars of two high-pressure boilers, coal fired, which will be installed on a passenger vessel now being built by Messrs. William Denny and Brothers for Turbine Steamers, Ltd., the managing owners of which are Messrs. John Williamson and Company.

In determining the type of boiler for this vessel, it was necessary to select a design that would be suitable for general mercantile practice, and one preferably free from as many bolted and riveted joints as possible, due to the high pressure to be adopted. It was also considered important that all the pressure parts should be as far as possible circular in section. After



575 LB. PRESSURE SINGLE-FLOW BOILER FOR CLYDE STEAMER

careful investigation it was decided to adopt the Yarrow type, and the order was placed for the two boilers by the main contractors, the Parsons Marine Steam Turbine Company, with Yarrow and Company, Ltd.

The design of the boiler has been passed by the Board of Trade, whose officers have offered many valuable suggestions, and who have given every assistance to facilitate this new development. Each boiler has a total heat-

ing surface of 3420 square feet, of which the superheating surface is 870 square feet; in addition, there are 2200 square feet of air heating surface for preheating the air prior to its admission to the closed ashpit. The safety valves are set to 575 lb. pressure, and the final temperature will be from 700 deg. to 750 deg. F. The test pressure is 913 lbs. The design generally, while not unlike that used in the navy, has been based on mercantile practice, and more closely follows the design of the Yarrow land type boiler now in use at several electric power stations.

As will be seen from the frontispiece, engraving the boiler consists of a forged steam drum connected to the three forged water drums by means of straight tubes expanded and bell-mouthed in accordance with the usual practice. Between the two water drums on the right-hand side of the boiler is a superheater, which consists of a forged drum with a number of U-tubes, and which is placed between the two generating elements. The gases all pass up one side of the boiler and through the air heater situated above the boiler and to the funnel. The reason for adopting a single-flow type of boiler where all the gases pass through one side is because this design makes in this particular case a somewhat better arrangement in the ship than the double-flow type, where the gases pass equally through each side. The generating element on the left-hand side of the boiler absorbs a considerable portion of the heat from the furnace by direct radiation, and it will be noted that the proportion of the total surface of the boiler subject to direct radiation is considerable, which is an important feature in modern water-tube boiler design, not only increasing the output and efficiency of the unit, but also providing a large amount of comparatively cool surface adjacent to the combusion chamber, which lengthens the life of the brickwork.

The admission of air for combustion is arranged in the following way: The cool air in the stokehold enters an opening between the inner and outer casings at the front of the boiler, about 6 ft. up from the firing floor, passes up the double casing through the air heater, down the double casing at the back of the boiler into the closed ashpit, and so through the fire-bars. The efficiency of the unit is naturally increased by the air heater, which extracts heat from the flue gases, and, in addition, the air in its passage to the combustion chamber, as above described, takes up a certain amount of heat which would otherwise be lost due to radiation, and incidentally keeps the stokehold cool. Also the circulation of air in close proximity to the furnace lining helps to keep the brickwork at a temperature which ensures low cost of upkeep.

For controlling the supply of steam—especially as, unlike an oil-burning boiler, the supply of fuel cannot be quickly cut off—various means of regulation have been provided. If reference is made to the drawing, it will be seen that a damper is fitted in the uptake at the side of the top of the air heater. When this damper is in its horizontal position the air passes through the air heater to the combustion chamber. When, however, the damper is brought to a vertical position, the air from the fan passes straight up to the funnel, thereby short circuiting the air heater and entirely stopping the supply of air for combustion. This arrangement would be used when the engines are stopped suddenly, *e.g.*, when the vessel stops at a pier. Provision is also made for controlling the speed of the forced draught fan, thereby limiting the amount of air for combustion. A still further control is to by-pass the steam direct from the boiler to the condenser by the silent blow-off.

In preparing the design of a high-pressure boiler, it is advisable to reduce the number of riveted and bolted joints to a minimum, and how this has been accomplished in the present case will be seen from the fact that the steam drum has no riveted joints at all, and, apart from the attachment of boiler mountings, the only bolts are those required to secure the two internal man-

hole doors. In the water drums and superheater drum there are no longitudinal joints, and only one circumferential riveted joint securing the front end plate in which the manhole is placed. The other end of these drums is solid.

All the drums have been manufactured by John Brown and Company, Ltd., of Sheffield, and a short description of the process of manufacture may be of interest. The steel used is ordinary boiler steel, 26-30 tons, with 30 per cent elongation in 3 in. lengthwise, and not less than 20 per cent elongation in 3 in. transverse. The large steam drum is made by the following method: A large octagonal ingot is forged under a hydraulic forging press to a round billet; it is then cut to a length which will give the weight necessary for the finished forging, and is carefully examined for any surface defects. The billet is then bored with a hole throughout its entire length, large enough to make a mandrel for the second forging operation.

The second forging operation consists in expanding the billet to a larger diameter without increasing the length; the internal diameter after this operation is slightly less than the finished diameter of the steam drum. This operation is shown in Fig 1. The expanded forging is reheated ready for the third operation, which consists in forging on a mandrel in such a manner as to increase the length without increasing the diameter. A large mandrel is used of a diameter approximately that of the finished drum, and forging is continued until the required length is obtained. This operation is shown in Fig 2. The chain-dotted line shows the form of the forging at the end of the process. The thickness of the main body is now that required for the drum, plus machining allowances.

The ends of the forging are left thicker to allow for the final operation, which takes place after the internal diameter of the drum is bored to the finished sizes. This last forging process consists in closing in both ends as nearly as possible to the required shape of the finished drum. The final closing-in is performed on a round bar or mandrel somewhat smaller in diameter than the manholes in the ends. The forging is then thoroughly annealed and sent to the machine shops, where the necessary mechanical tests are taken and the final machining carried out.

The process of forging of the water and superheater drums is much simpler.

The boiler tubes and superheater tubes are solid drawn cold finished. The problem of boiler fittings, such as safety valves, stop valves, joints etc, is one to which much care must be devoted. The safety valves require special consideration in design and construction for high pressure and temperatures. The ordinary safety valve, with its small lift, is a trap for grit, etc, when the valve is blowing off. The valve shuts down on this grit and soon indentations extend across the face and the high velocity causes grooves to be cut. The safety valves for the two boilers above referred to are of the high-lift type manufactured by Cockburns, Ltd., and either this type or the full-bore safety valve manufactured by the same firm would seem to meet adequately the problem of high pressures and temperatures. The stop valves and other fittings are of the usual design, strongly constructed and of suitable materials. The main stop valve has monel metal spindles, valves, and seats, but other materials have been found to be equally satisfactory. The joints, as already stated, are metal to metal, and the flanges are particularly thick, so as to avoid the possibility of any distortion. The feed regulators are being supplied by the Astor Engineering Company, Ltd., and the water gauges by Dewrance and Company, Ltd.

With regard to the initial cost of a high-pressure boiler, the price of the solid drums is at present greater than built-up drums, but a number of the fittings are common to boilers, whether for high or low pressure, such as

furnace fittings, casings, uptakes, air heaters, brickwork, etc., so that the total increase in cost is not considerable.

It is estimated that the two boilers described above with forged drums for 575 lb. pressure cost approximately 15 to 20 per cent more than similar boilers having the same total heating surface, but having a boiler pressure of 250 lbs. per square inch. If, however, a comparison is made on a more correct basis—that is to say, taking into account the fact that the quality of the steam from the 575 lb. boiler is of higher value than in the case of a lower pressure—then the cost of the high-pressure boiler is very little more than the cost of the other. The saving due to the reduced heating surface required in the case of the high-pressure boiler nearly compensates for the additional cost of the forged drums and certain other rather more expensive fittings. The initial cost of high-pressure boilers is therefore no handicap to their introduction.

MERCHANT MARINE

Sale of American Oriental Line to Dollar Interests

The Nautical Gazette, 17 April, 1926.—Contrary to the recommendations of President Crowley of the Fleet Corporation and despite protests of Seattle shipping interests the Shipping Board decided last Tuesday to accept the bid of R. Stanley Dollar for the American Oriental Line and the five ships which have been operated for the Board by the Admiral Oriental Line. One other bid for the service was received from W. B. Keene, former Vice President of the Fleet Corporation, who was acting in behalf of Seattle interests. The price to be paid by Mr. Dollar is $900,000 per ship, a total of $4,500,000. Mr. Keene bid $4,000,000 for the service, and just prior to the acceptance of the Dollar bid by the Board he was prepared to submit a higher bid, but this the Board refused to consider on the ground that Mr. Keene had not complied with the provisions of the sales contract.

The five ships sold are the *President Grant, President Jackson, President Jefferson, President McKinley,* and the *President Madison.*

The bids were submitted last week and referred to President Crowley of the Fleet Corporation for his recommendation after the terms of the sale contract had been revised by the Board at the request of Senator Wesley Jones of Washington. President Crowley recommended to the Board that neither the bid of Mr. Dollar nor that of Mr. Keene be accepted on the ground the prices were insufficient and that still further changes should be made in the terms of the contract of sale.

Seattle shipping interests, represented by Chas. E. Peabody, W. C. Dawson, and H. F. Ostrander, appeared before the Board and opposed the sale of the line. Mr. Peabody said that he was not engaged in a fight against the Dollar interests, but that he and others had appeard to apply for allocation of the line for operating under government ownership. He stated that a new company had been organized for this purpose and that it was not impossible for this new organization to buy the line. He declared that the Seattle interests were anxious to see that there was no curtailment of the service from Seattle. He expressed regret that the question of the sale of the line should have come up at this time when there is no representative from the Pacific Northwest on the Shipping Board. It will be recalled that Commissioner Haney represented the Pacific Northwest on the Shipping Board until his resignation a few weeks ago, and as President Coolidge has not appointed a successor to Mr. Haney, that region is not now represented on the Board.

Protests against the sale of the line to the Dollar interests have also been made by Senator Jones who has contended that it is inadvisable to create a monopoly of shipping on the Pacific coast. Representative Madden

of Illinois has also objected to the sale of the line to the Dollar interests on the same grounds.

Despite these objections, however, the Board has concluded the sale of the service to the Dollar interests, Chairman O'Connor, in his official announcement of the sale, stating that the ships were sold for $900,000 each with a guarantee to maintain adequate service between Puget Sound and the Orient.

Mr. O'Connor said: "The sale was made in pursuance of the Shipping Board policy in the upbuilding of an American merchant marine to transfer shipping as rapidly as possible to private ownership, thus saving the government a great annual loss. By private ownership alone a permanent American merchant marine can be secured. Before the Shipping Board will consider a bidder, the Board must be satisfied of the American citizenship of the bidder, also his ocean experience and his financial ability. The successful bidder, Admiral Oriental Line, satisfied the Board of its American citizenship, of its stockholders and their ocean-going experience, and their financial ability. The bid was higher by $100,000 per ship or $500,000 than any other bid. The ships were therefore sold to the Admiral Oriental Line. The vote was four to one, Commissioner Benson voting against the sale."

Admiral William S. Benson, said he had opposed the sale because he objected to a monopoly of American shipping on the West Coast and because of the inadequacy of the Dollar bid. This view is known to be shared by Captain Crowley, who feels that, inasmuch as similar tonnage was sold to the Munson interests for $1,926,000 a ship, this should be the minimum price acceptable for the West Coast vessels.

The recommendation of President Crowley against sale of the vessels to either of the two bidders was based upon the belief that the government is not properly protected in the form of contract on which bids were made; that the price offered was inadequate; that a bond to insure the payment of liquidated damages to the government in case the service is not maintained in accordance with the contract should be exacted, as it was in the case of sales of the Pan-American Line and the California-Orient Line on which similar ships were sold, and that the number of round voyages per year—seventeen—is insufficient.

The service at present has a sailing schedule of a departure every twelve days, or thirty round voyages per year. He thought the business in the ports served by the line is sufficient to maintain at least the present schedule, and that there are possibilities that the trade will increase to a point where additional ships would be justified.

Captain Crowley's recommendation also sets forth that the irrevocable letter of credit which the Admiral-Oriental Line agrees to give as the first payment for the ships, is not as satisfactory as a cash payment, and calls attention to the fact that the Munson Steamship Company in purchasing the Pan-American Line from the board was required to make its first payment in cash.

He added that the American-Oriental Mail Line has a brighter outlook toward success than the Pan-American Line had at the time it was sold by the Board.

The letter of credit to be given by the Admiral-Oriental Line is for 22½ per cent of the purchase price and carries interest at 4½ per cent. Mr. Crowley pointed out that the operation of the vessels showed a net profit over a period from October, 1925, to March, 1926, of $294,494.17. Administrative expenses totaling $66,582.86 were charged against the vessels' showing at this net profit. He expressed the belief that under private operation these voyages would have returned an even greater profit.

The boards' action in accepting the Dollar bid represented the first

difference of importance between it and Captain Crowley since the latter became President of the Emergency Fleet Corporation last October.

The Nautical Gazette, 24 April, 1926.—The prediction made in *The Nautical Gazette* last week that the sale of the American Oriental Line to the Dollar interests would not be permitted to stand unchallenged has proved to be no mistaken prophecy. Immediately upon the Shipping Board's announcement of its acceptance of the Dollar bid, protests against this action began to pour in from every side. These objections culminated last Monday in the adoption by the Senate of a resolution, introduced by Senator McNary of Oregon, requesting rejection of the Dollar bid and of all others received thus far for the American Oriental Line. This resolution was adopted without debate but on the following day Senator Clarence C. Dill of Washington voiced a protest in the Senate against the sale of the line to the Dollar interests. Senator McNary's resolution stated that the Oriental Mail Line, consisting of five *President* type ships, operated between Puget Sound and the Orient and constituting the only American passenger cargo line in the Pacific Ocean north of San Francisco, represents an original cost in excess of $31,000,000, and that the proposed sale of the line to Mr. Dollar would place in the hands of one concern the trans-Pacific shipping of San Francisco and the Pacific Northwest thus establishing by government action a monopoly in the Pacific. The resolution further recites that the Shipping Board at the time it voted to sell the ships to the Dollar interests had a supplemental bid of another bidder offering a higher price which bid remained unopened. The resolution declares that the assets of the Shipping Board are threatened with dissipation and a substantially higher price could be obtained if new bids were invited. In the face of this protest the Shipping Board took action to delay further progress of the sale of the line to Stanley Dollar until it has obtained from its general counsel as to whether the Board is required to abide by the Senate resolution. Mr. Dollar takes the very reasonable position that inasmuch as the Board has given proper authorization for the sale and has formally notified him of its action, he would be upheld legally if the matter were carried to the courts. Mr. Dollar feels that he has acted in good faith, that he presented his bid on a competitive basis, in accordance with the advertisement, and that the sale has been properly completed. The formalities of the sale have been almost completed, the contract having been duly approved and signed by the Board's counsel and Mr. Dollar, and the Board having accepted and cashed Mr. Dollar's check for $112,500, this amount being two and one-half per cent of the total bid. The only time needed to complete the sale is the signature of President Crowley of the Fleet Corporation, and it is to be hoped that this signature will be appended to the documents without further delay, thereby completing the transaction in a businesslike manner.

That the Shipping Board is determined to dispose of its property to private interests is evident from the announcement that the Oregon Oriental Line is now being offered for sale. The placing of this line on the market at this time would seem to carry more than ordinary significance inasmuch as it follows so closely upon the heels of the Senate's opposition to the sale of the Admiral Oriental Line to the Dollar interests. President Crowley of the Fleet Corporation has been directed to draw up an advertisement for bids for the Oregon Oriental Line which operates eleven cargo vessels out of Portland. It is the principal American foreign trade line serving Oregon ports and it is common knowledge that the Board had not contemplated the immediate sale of the ships prior to the Senate's action in opposing its policy in regard to the disposal of the Admiral Oriental Line. In some quarters the offering of the Oregon Oriental Line is re-

garded as retaliation by the Board against the action of the Senate in adopting the Admiral Oriental Mail Line resolution. On the other hand, the theory is advanced that this offering for sale of the Oregon Oriental Line is an attempt to win the support of the administration to the Board's disposition of the Admiral Oriental Line. There is also significance in the fact that the Oregon Oriental Line is now operated for the Shipping Board by the Columbia Pacific Steamship Company which was one of the firms represented by Mr. W. B. Keene who competed with Mr. Dollar for the purchase of the Admiral Oriental Line. In passing the Merchant Marine Act it was the intent of Congress that the government ships should be transferred to private interests as soon as possible and in its endeavor to carry out this provision of the act, the Shipping Board should be aided rather than hindered by the Senate.

Analysis of American Foreign Trade in 1925

The Nautical Gazette, 10 April, 1926.—An analysis of America's foreign trade for 1925 by the Foreign Commerce Department of the Chamber of Commerce of the United States shows that a group of ten commodities constituted half of the value of all exports. The ten leading commodities were raw cotton, automobiles and parts, gasoline and naphtha, leaf tobacco, wheat, refined copper, lard, coal and coke, lubricating oil, and flour.

"The presence of important crude materials among these ten leaders," the report says, "should not obscure the fact that manufactured articles, exclusive of manufactured foodstuffs, such as flour, actually made up 52 per cent of our total domestic exports." The report continues: "Finished manufacturers alone amounted to $1,843,000,000 or 38.2 per cent of our exports, a position surpassed only by three years, 1916, 1917, and 1920. In value this group exceeded that of 1924 by $254,782,000, or 16 per cent, due largely to increased shipments of automobiles, parts and tires, machinery, cotton manufactures, refined petroleum, cutlery, radio apparatus, and paints and varnishes; some being at an increased price. Exports of raw materials were nearly 30 per cent of our total exports, and were 6.6 per cent higher than in 1924. A decline was registered by crude foodstuffs of $75,000,000, or 19 per cent."

Our exports during 1925 of $4,909,396,000 is the greatest since 1920 and 6.9 per cent over the 1924 total. A monthly average of $409,116,000 worth of merchandise left the United States for foreign destinations during 1925, an increase of $26,534,000 over the monthly average of 1924.

Discussing the leading commodities in export trade, the report shows raw cotton, with $1,059,751,000, so far at the head of the list as to be more than three times as valuable as its nearest competitor, automobiles and parts, at $303,106,000. Next in order comes gasoline, naphtha, and other light products of distillation, $197,598,000; leaf tobacco, $153,788,000; wheat, $148,717,000; refined copper, $140,221,000; lard, $118,090,000; coal and coke, $107,035,000; lubricating oil, $91,060,000, and wheat flour $85,067,000. Among these ten leaders, five showed decreases from the 1924 figures: leaf tobacco, wheat, lard, coal and coke, and wheat flour. Wheat showed the largest falling off, 37.3 per cent, whereas on the increases cotton showed a 11.5 per cent increase, and automobiles and parts 47.4 per cent increase.

Other important exports showing gains in value over 1924, were: barley, automobile tires, metal-working machine tools, resin, brass and bronze, oats, lead pigs, bars, etc., automobile engines, cutlery, cotton yarn, zinc blocks, pigs and slabs, textile machinery, sulphur, silk hosiery, oil-well machinery, radio apparatus, raisins, and internal combustion engines, except automobile engines.

Declines in value from 1924 were made by illuminating oil, rye, bacon, crude petroleum, logs and timber, fresh apples, canned milk, cigarettes, corn, hides and skins, except furs, structural iron and steel, oleo oil, and dried prunes.

The quantity of unmanufactured cotton exported increased 901,576,000 pounds or 25.9 per cent over its 1924 figures, 4,384,160,000 pounds being exported in 1925. Automobiles and trucks shipped abroad in 1925 gained 124,192 in number, or 69.5 per cent greater than the 1924 figure; automobile parts exported gained 13,846,000 pounds or 3.9 per cent over its 1924 mark. Gasoline, naphtha, and other light products exceeded their 1924 mark by 103,666,000 gallons or 8.7 per cent. The quantity of leaf tobacco declined 97,910,000 pounds or 17 per cent. Wheat declined 79,776,000 bushels or 48 per cent. The 1925 quantity of wheat exported was 86,526,000 bushels, as compared with 166,302,000 bushels in 1924. Refined copper dropped 41,560,000 pounds or 4.1 per cent. Lard declined 255,266,000, pounds or 27 per cent. Although coke and coal dropped 163,537 tons, its 1925 figure was only 0.8 per cent lower than its 1924. Lubricating oil increased 23,746,000 gallons and was 6.3 per cent higher than in 1924. Wheat dropped 30.5 per cent in quantity.

Crude rubber stood first on the import commodity list in 1925, with raw silk, coffee, and cane sugar occupying second, third, and fourth place respectively, according to the analysis. In 1924, the figures show, crude rubber imports ranked fourth. Raw silk and coffee both retained their 1924 positions. The imports last year reached a total value of $428,000,000.

The analysis shows that crude rubber, including latex, with a value of $429,705,000, advanced 146.6 per cent over its 1924 figure, an increase of $255,474,000. Accompanying a large increase in the price per pound—an average foreign price of nearly 50 cents a pound compared to 24 cents in 1924—the quantity increased 153,633,000 pounds, or 20.9 per cent. Raw silk, valued at $396,286,000, showed an increase of 21 per cent. The quantity imported was 63,764,000 pounds, representing an increase of 24.3 per cent. Coffee, at $286,212,000. shows an increase of 15 per cent over its 1924 mark. The quantity decline from 1,470,870,000 in 1924 to 1,283,601,000 pounds—the average foreign price was nearly 5 cents a pound above 1924. Cane sugar declined in value $117,505,000, or 32.3 per cent. The severe decline in value of sugar was due to the drop in price per pound from 4.39 cents in 1924 to 2.75 cents in 1925, for the quantity imported was very large.

The fifth place is held by unmanufactured wool which rose from sixth place in 1924, due to an increase of 52.4 per cent in value. The quantity of unmanufactured wool increased 61,139,000 pounds or 22.8 per cent. Dressed and undressed furs at $105,632,000 represents a gain of 27.2 per cent over their 1924 figure. The number of such furs, 167,891,000, is 14.2 per cent higher than the 1924 mark. Standard newsprint paper valued at $103,717,000 shows an increase over its 1924 high record of 2.4 per cent. The quantity increased 182,383,000 pounds or 6.7 per cent. Raw hides and skins, except furs, in eighth place valued at $96,746,000, show a gain of 28.9 per cent. Their 362,288,000 pounds show an increase of 1.6 per cent. Tin in bars, blocks and pigs increased $26,168,000 or 38 per cent in 1925. The quantity, 171,686,000 pounds, represents an increase of 17.8 per cent. Burlaps, with a gain of 43.2 per cent over 1924, were valued at $85,028,000. The quantity, 675,816,000 pounds, is a gain of 8.7 per cent over the 1924 quantity.

Anglo-American Trade

Engineering, 2 April, 1926.—Two events which have been accorded prominence in the daily press give increased interest to one of the latest reports of the Department of Overseas Trade. These events are, the

visit of six representatives of the engineering trades unions to America to investigate for themselves the conditions under which their brethren there secure greater output; and the development of the latest negotiations in the British coal industry. The report we refer to is one of the Overseas Department's regular series, and deals with the Finance Industry and Commerce of the United States of America. It is by Mr. J. Joyce Broderick, Commercial Councillor of H. M. Embassy, Washington and is carried as far as October, 1925. It contains, along with much interesting data, some pertinent passages on such matters as those instanced above.

Apart from the lessons to be learned from the practice of other countries in the conduct of their great industries, the subject of coal production abroad is of direct interest to Great Britain. In this case, Mr. Broderick, referring to the rise in price of both bituminous and anthracite coal in U. S. A. consequent on disputes, states that a continued increase in this direction indicates the possibility of orders to British shippers for Welsh anthracite, as well as low volatile bituminuos coal, from importers on the North Atlantic coast. Bituminous coal-mining in America differs from the anthracite in being partly worked by union and partly by non-union labor, anthracite being mined entirely by the former. A three years' agreement, expiring in March 31, 1927, was entered into between the owners of bituminous mines and men in the union areas, and has resulted in conditions in which it has been impossible to meet competition from non-union mines, and consequently the closing down of those worked by union labor. Proposals for a revision of the rates having been rejected, some of the colliery companies, on petitions from the unemployed men, reopened their mines at the non-union rates, the men having necessarily broken away from the union. This is held to be a breach of the agreement by some of the leaders, but their arguments are considerably weakened by the fact that one of the strongest trade unions, the Brotherhood of Locomotive Engineers, owns or controls one or more mines which are operated at rates of wages much below the scale of the United Mine Workers Union.

The anthracite fields are controlled by a relatively small number of large companies, all more or less connected with one another, and are all worked by union labor. The strike in this industry which took place, for a wage concession, on the expiry of the last agreement on September 1, 1925, naturally shortened the supply of anthracite and this increased the demand for bituminous coal, with the consequent increase of prices of both sorts alluded to above. The miners, as a matter of fact, returned to work on February 18, 1926, on the basis of the old contract, which has been renewed for five years, subject to some fresh provisions for wage revision and arbitration if the need arises. This resumption, which does not increase the cost of anthracite mining, was signalized by an immediate fall of 20 to 40 per cent in the price of coke and other low-volatile fuels used in place of anthracite. There is still a scarcity of all but bituminous coal, and the outlook for the industry, therefore, is by no means settled. Both the anthracite and bituminous coal markets may have to adjust themselves to the change in demand resulting from the shortage of hard coal, while the producers of soft coal have still unsettled wage questions to face.

The coal export trade considered as a whole has shown a decline. American exports were, in 1924, about 3.5 per cent of her production, which was just over 17 million short tons. This was a drop of 20 per cent on the figures for 1923, but in spite of this there are certain aspects of her coal trade which are worthy of careful note. One of these is the expansion of American exports of bituminous coal to Italy, this having increased from 585,000 tons in 1923 to 871,000 tons in 1924. More striking still is the rapid growth of the trade with Central and South America. In 1923, 0.64 million tons were exported to these countries; in 1924 the figure had

risen to 1.44 million tons. Of anthracite, in 1924, America exported 3.58 million tons, Canada, who took nearly 98 per cent, being the largest customer.

The important petroleum industry is suffering from over production, and it is stated that heavy stocks of crude oil have accumulated. This has also occurred in the case of petrol. To such an extent has this happened that to get rid of these stocks price cutting has been resorted to. In spite of this evidence of large supplies, or perhaps as a result of it, a committee of the American Petroleum Institute was formed to investigate the assertion of prominent geologists that America's petroleum deposits would be exhausted by 1950, or sooner. The committee has issued a very optimistic report, which states unequivocally that this estimate is very wide of the mark. It predicts recovery of oil at present left in wells through expense of pumping; and that, as the limit of deep drilling has not yet been reached, oil may still be obtained from the lower levels of existing fields. It further points out that there are immense areas of possible oil-bearing land as yet unexplored, and expresses conviction regarding the certainty of further discoveries, while it refers to the native deposits of shale and lignitis as affording an almost unlimited supply of oil when cost of production permits.

Two paragraphs of the committee's report are, it is to be feared, a little sensational. One is to the effect that the mileage of the motor car per gallon can "be doubled by structural mechanical changes," while the other states that the extension of the cracking process applied to fuel oil in order to procure increased supplies of petrol will so diminish the supply of fuel oil available that it will cease to compete with coal. We do not think the modern car manufacturer will consider the first at all likely for many a long year, while the Diesel-engine maker will hardly welcome the second, to say nothing of the users of fuel oil under boilers. The report apparently does not give any figures of the bulk of the petroleum export.

The electrical industry in the United States is in a very flourishing condition, due to the extremely rapid increase in the consumption of current, the average mean daily output, having increased by over 63 per cent since 1919. In view of the present electrical situation in this country, it is interesting to note that the increased demand is accompanied by a marked reduction in the price of current due to the consolidation of production, a relatively few large companies taking the place of numerous smaller ones. As evidence of prosperity in manufacturing concerns, the Westinghouse Electric and Manufacturing Company are stated to have created a record in monthly sales in 1925, being closely followed by the General Electric Company and others. The report does not refer in detail to hydro-electric schemes.

The manufacture of the many forms of motor vehicles now constitutes very nearly the largest industry of the country. It gives employment to about 3,000,000 people. Examination of the figures of the report shows that output is still increasing. Stocks at the commencement of the 1926 season were expected to be rather too heavy. Grouping, as in electric distribution, is also taking place in this trade, the control of 85.68 per cent of the total output in the first half of 1925 being in the hands of about ten large companies. Hitherto, the domestic market has been the chief outlet, but it is shown that this, from various reasons, is becoming relatively less important, and the point is strongly emphasized that the energies of American automobile manufacturers are soon likely to be more vigorously directed to the export field, both by direct shipment and by setting up assembly plants in the countries invaded, the attack being rendered more effective by the more powerful sales organizations of the large groups. The probability of this campaign is worth noting, as also is the fact that Canadian works, controlled by American capital, are likely to be used for building cars for export. The average export price for passenger cars in 1924 was 10.7 per cent lower than

the retail price in the United States. In connection with the motor trade it is interesting that only a few of the smaller tire-manufacturing concerns were affected by the recent rise in rubber, about which so much was heard. The increase of the use of the balloon tire, from 18 per cent of all the types fitted in 1924, to 68 per cent in the first seven months of 1925, is indicative of permanent change in the requirements of the public.

The iron and steel industry has suffered somewhat from the universal depression of recent years. The effect of the almost complete substitution of the eight-hour for the twelve-hour day in this trade has not yet been fully investigated. Some imports have increased of late. Steel bars, joists, rails, and so forth, from Europe have been offered at Atlantic ports at sufficiently attractive figures to capture a portion of the domestic trade. Other imports, such as pig-iron, of which Great Britain has always been the principal supplier, have decreased considerably. Purchases of all classes of cutlery are also stated to have fallen off, and the suggeston is made that, as the particular merits of Sheffield cutlery are not so widely known as they might be, a cooperative advertising campaign might be productive of increased business.

It must not be thought that, because we have commented only on matters of engineering interest, Mr. Broderick confines himself to these. On the contrary, there are in the report notes on textiles, clothing, silk, leather and leather products, pottery, chemicals, and so forth. As a matter of fact, stress is laid upon the point that it is in these industries and the luxury trades, rather than in the heavy industries, that possibilities for British enterprise lie, and some valuable suggestions are made with regard to areas which, though now neglected, might provide good markets if properly canvassed.

One broad lesson must not be overlooked. This is, that an enormous market is afforded to the American exporter by the British Empire. No less than 40 per cent of the total value of American exports finds it way to us here or overseas. No figures are available of the volume of empire trade in return, though it may be said that, since the war, Canada now occupies the former position of Great Britain as chief supplier to the United States. In 1924 the mother country was relegated to second place, and supplied only a little over a third of the value of British purchases by the United States, and only 10.2 per cent of the total American imports as against 10.7 per cent in 1923.

At least two significant references are to be found in the review of labor and social questions. The American Federation of Labor, which is stated to have about three million members, has recently adopted resolutions condemning political activity on the part of such organizations, and also, the invasion of private industry by the government. Again, the operation of the immigration quota scheme is said to have already restricted the supply of ordinary labor, and employers and labor leaders will no doubt shortly be ranged in opposite camps over the question of the modification of this law, which it is considered has also affected the shipping industry to a serious extent by reducing passenger traffic.

The shipping trade generally appears to be in a chaotic condition, while as regards railways and inland waterways in America there have been few fresh developments of interest. The entry of Messrs. Ford into commercial aviation on a practical scale is a comparatively recent event.

One section of the report, which will probably appeal to the engineer, refers to the movement to simplify practice and eliminate waste in industry and trade. This is extending at a rapid pace in all directions. As an illustration of the work done, it may be stated that the sizes and gauges of sheet steel have been reduced from 1,819 to 263, sizes and types of rasps and files from 1,351 to 496. Sizes and varieties of woven wire fencing from 552

to 69. These are only three examples among many. The movement is all to the good, even if only looked at from the point of view of the British exporter.

MISCELLANEOUS

European Navies

The Army, Navy, and Air Force Gazette, 10 April, 1926.—The first quarter of 1926 has seen various developments in the foreign navies, reminding us once again, as Mr. H. G. Wells said, "this 'ere progress—it goes on." So it certainly does in the naval world, and any fleet which is content to rest on its past work will soon decline in power and efficiency. Since the official Return of Fleets was issued a month ago, the German Navy Estimates have become available, and it is significant that, on a much smaller basis, they show an increase of as much as the British Navy Estimates show a decrease (£2,400,000), providing now for a total of 203,300,000 marks, or well over £10,000,000. The increase in personnel will bring the total up to 13,161, or within 1,839 of the maximum of 15,000 allowed by the Peace Treaty. Germany recently completed her first post-war cruiser, the *Emden*. A second cruiser, *B*, is building at Wilhelmshaven, and *C* and *D* are projected, so that in the near future there should be a squadron of four of these 6,000-ton cruisers, armed with eight 6-inch guns and four torpedo tubes, and able to steam 27½ knots. The six destroyers, *W*-102 to *W*-107, now building, of 773 tons and 34 knots, are to be followed by six more this year; but no submarines are in the lists, the building of such craft, even for commerce, being forbidden by the Treaty. It is proposed to begin replacing the six battleships now in service, but the tonnage limit for armored ships is 10,000—the same as for cruisers under the Washington pact. That Germany should be spending about nine millions upon new construction at a time like the present shows that she still clings to the idea that her future lies upon the water.

Other European navies are making progress which, if not actually so great, is steady and consistent. France has now ready for trial her first post-war cruiser, the *Duguay-Trouin*, of 7,873 tons, and launched recently her first 10,000-ton cruiser, the *Duquesne*. Three of each class are in hand and three more are projected to be laid down between 1926 and 1929. The entry of these cruisers into service will be welcomed by the French Navy, which, apart from the four ex-German and ex-Austrian vessels, has not completed a cruiser since the two of the *Edgar Quinet* type in 1911. As in our own navy, the Mediterranean and Atlantic fleets, under Admirals Violette and Chauvin, have recently been engaged in spring exercises, and mimic bombardments of Toulon and Lorient have been carried out. A subject of comment has been the prodigal use of French naval personnel, over 50,000 officers and men, it is said, being occupied in connection with a force which is numerically similar to that of Italy, which has only about 30,000 officers and men. At a recent meeting with Admiralty chiefs, Signor Mussolini, who, in addition to being Premier, is also Minister of Marine, conferred upon certain urgent problems, which, according to the *Tribuna*, relate to the "progressive inferiority" of the Italian fleet, due to the slow and inadequate warship construction. Italy has but two cruisers, the *Trento* and *Trieste*, in hand, as compared with six for France, and although three more have been projected for some time, no appropriations for their building have yet been made.

There are indications of progress in the minor navies of Europe. Greece has decided to invite tenders for the construction of either two or four 1,500-ton destroyers, the length of credit which can be given by the builders being taken into account in awarding the contract. After the excellent job which Messrs. White, of Cowes, made in the reconstruction of the four

vessels of the *Actos* class, it may be hoped they, or some other British firm, will be successful in the new tenders. It will be recalled that Turkey last year ordered two submarines from the Fijenoord Company, of Rotterdam, which is advised by Mr. Marley F. Hay, the well-known American submarine architect. While Turkey is going in for Dutch-built submarines of American design, Holland is building four destroyers to the British designs of Messrs. Yarrow and Company. There has been less news of late from the Baltic navies, but the report from Gothenburg that the Commander-in-Chief of the Finnish Navy has been dismissed because of his inability to speak the Finnish language, if true, is a matter for regret. If this refers to Commodore von Schoultz, he was an officer of the Russian Navy in the war, on duty as an observer with the British grand fleet, and impressed all with whom he came into contact as an officer of rare observation, talent, and capacity. The Finns could ill afford to lose such a chief.

Trade Defense

By Sir Herbert Russell, *The Naval and Military Record*, 14 April, 1926.—Strategical vision in relation to the future naval war is very spacious. In other words, it is very indefinite. We can only base any store of speculation upon a review of the nations which are in a position to wage naval warfare on the grand scale, and of the possible causes which might result in their waging it. Such a review at the present time inevitably attracts us to the Pacific. This is not to say that there are any visible reasons for assuming that war will break out in the Pacific. But in answer to the question of which is the most likely zone of conflict should naval war ever break out again, we naturally look towards the Pacific. The term, "occanic warfare" has become current in consequence of this tacit conclusion. It is largely taken for granted that the design of the new 10,000-ton cruisers has been largely influenced by this orientation.

The question of trade defense is in the very forefront of our war-time problems. The lesson of the Great War was a very hard and a very bitter one, and there is no doubt that the best brains in the governance of our sea power have been deeply exercised as to how to apply it to fullest advantage in providing against future hostilities. For some reason which is not very clear to me it is widely assumed that trade protection under conditions of oceanic warfare will prove very much more difficult than in the case of localized warfare, such as the German submarine campaign represented. I suppose this is based upon a sort of sketchy idea that the longer the line of communications the greater the difficulty of guarding them. In a purely military sense this is a truism. In relation to trade routes, which are not necessarily military lines of communication at all, I fail to see how the principle applies.

No sea power at war with a nation of approximate strength could possibly dispose of commerce-destroying forces indiscriminately along the great trade routes of the world. Its main disposition would have to be devoted to countering those of the enemy. Its raiding forces would be insufficient for blue water guerilla operations in such a scale as is presupposed by those who think these will present the gravest problem of the future war. True, we know that one daring raider can do an immense amount of mischief—given the opportunity. I make this reservation, because vessels like the *Emden* and the *Moewe* were given the opportunity.

It is generaly assumed that trade attacks will be aimed at focal points. There are very many focal points in the long chains of trade routes, and whether any one power could effectively guard them all is a very serious question. Personally, I should think not, but the first point to be defined prior to any useful discussion of the subject is some clear idea of the enemy resources which could be directed against them. The German submarine

campaign was essentially a war upon focal points. All British-bound shipping had to converge within very narrow limits as it neared our shores. Probably our losses would have been considerably less had the Germans been in a position to disperse their destructive forces on the plan of oceanic warfare. Had ten thousand miles of water separated the two countries they would have been compelled to do so. As it was, our strategical advantages for containing operations likewise proved their tactical advantage for submarine warfare.

The protection of commerce is one of the duties of the navy, but I think it might well be regarded as also one of the duties of commerce itself in a much wider sense than it is. Down to the middle of last century practically every big mercantile vessel was either built to carry guns, or did actually carry guns. I was recently reading a description of the Cunard steamship *Persia,* a paddle liner of the '60's, and it was stated that she carried small cannon and a large rack of cutlasses on her saloon staircase. The East India Company's ships went well armed down to the end of their existence. It is true that times have radicaly changed. The East Indiaman was a fair match for a frigate. Commodore Danco's action ranks amongst the famous exploits of sea story. But comparatively few mercantile ships could be armed in such a fashion as to stand much chance against a war cruiser. Still most big freight steamers would be capable of carrying weapons which would enable them to put up a good fight against a submarine on the surface, and submarines are likely to prove the chief asset in commerce raiding.

A convoy of armed ships would be very much more difficult to successfully attack than an unarmed convoy, unless indeed the aggressor was so big and so mobile as to be capable of pounding her victims at a range beyond their ability of response. The hastily improvised armaments of wartime are little better than useless. If the idea that trade must help to protect itself is taken seriously, then provision for enabling it to do so must be made seriously. I think this is a subject which might well ocupy the attention of the Conference on the Limitation of Armaments. Granted the principle that it is not only the right, but the obligation, of a mercantile marine to be in a position to resist attack, and we then establish a very definite justification for a reduction of naval forces.

Thus far political quibbling has opposed any such idea. Even a defensively-armed merchant ship was regarded with suspicion and disfavor by neutral eyes during the Great War. The natural tendency is to look upon any armed vessel as a combatant vessel. Such a view needs only affect ourselves in the case of ships employed in foreign trade. It seems reasonable to say that if Great Britain is at war the British Empire is at war, and that, no matter how effectively ourtraders might be armed, they would always be free to enter the ports of any of the Dominions. But I believe a time has come when political quibbling upon this point might be tackled with a fair prospect of success. In the good old days before international laws, when common-sense ruled things, a merchant ship went armed as a matter of course. It is true to add that she had need. But so equally would she have need in the event of war. In the good old days the right of any ship to protect herself was universally recognized. Now it is only recognized to the degree that she may take her own part as well as she can—without the means of doing it.

I am merely arguing for a principle. I quite appreciate that there are big technical problems in the way of realizing that principle. But these are not insuperable. If we could maintain a navy adequate to the effective protection of even our vital trade under such conditions as we may visualize in connection with oceanic warfare, then the question would be of no more than academic interest. We are now faced with the fact that we cannot bear the burthen of such a navy. Happily, all the other maritime powers,

with the exception of the Uniter States, find themselves in the same boat. Protection of trade is a dominant element in the *raison d'être* for naval power. Granted, for the sake of argument, that trade could be made to a large extent self-protecting, what would be the situation? The nations which figure largely upon crippling trade as a salient feature in their war program—which are generally the weaker nations—would naturally dissent from the doctrine of self protection. But against their objection to the minimising of combatant opportunity is to be set the fact that they themselves would relatively benefit under such a principle, since their own trade would be correspondingly better able to look after itself.

There is really nothing extravagant in this idea, and probably the only reason why it has never heretofore received serious consideration is owing to the existence of a mass of international conventions aimed at preventing a merchant ship from defending herself. We know the Germans developed the principle before the war, and that some, at any rate, of their crack liners actually carried their armaments in the bottom of their holds whilst plying their peaceful business. We also know that there were many occasions during the Great War when British captains fervently ejaculated "if only I had a gun!" and when, had they possessed a gun, they might have beaten off enemy attack.

No doubt very much more concrete plans exist today for trade defense than was the case in 1914. But all these plans rest upon the principle of naval protection. I do not think that we can contemplate the possibility of abandoning convoy in consequence of any practicable scheme of arming merchantmen. But I do believe we could materially reduce both the necessity for, and the responsibility of, naval escort by such a scheme. Quite a moderate-sized freight steamer could be rendered capable of effectively hitting back at an *Emden* or a *Moewe*. This would probably result in the employment of much larger and more formidable cruisers for the purpose of commerce raiding. But the resources of the strongest naval power have their limitation, and large and formidable cruisers can never exist in such abundance as to be available for extensive depredations on the trade routes.

Enemy action in attacking trade during oceanic warfare will not, in my opinion, be chiefly concentrated against focal points, as is generally supposed for the reason that these will be presumed to be pretty well guarded. The big, sea-keeping submarine suggests the most formidable type of craft as a commerce raider, and she can prowl about in the blue water routes. Whether such desultory tactics would prove very profitable is another question, for as soon as a methodical scheme of routing was established during the Great War our losses began to dwindle appreciably. There was not much scope for routing in the western approaches and the Narrow Seas. The longer the line of communications the easier it is for merchant ships to diverge wide of the beaten track. A submarine would be very much like a needle in a haystack when she struck into the remoteness of the ocean, hoping to head off ships which in the normal course should pass that way. The *Moewe* owed much of her success to air reconnaissance. Detached submarines are unlikely to have this.

The term "merchant navy" is a new phrase and an anomaly. But I fail to see why it should not come to possess a certain element of literal application. Why should a valuable ship, with a freight worth half-a-million, be precluded from possessing the means to take her own part in wartime? Because rivals powers, which count upon sinking her, maintain that she would infringe the laws of neutrality if she went armed? That may be a good point with rival powers. It is not a good point with us. It is not common sense. If a man knows he has to walk through the haunt of armed robbers he slips a revolver into his pocket. He does not trouble about the question of a police permit. Anyhow, I trust the matter may be raised

at the Disarmament Conference, for it seems to me that a great deal might hang upon a new view of this controversial subject.

Deferring Disarmament

By Sir Herbert Russell, *The Naval and Military Record*, 31 March.—The recent collapse of the momentous session of the League of Nations at Geneva has reacted heavily upon the ideal of disarmament; for all that Sir Austen Chamberlain has announced a preliminary conference at Geneva for May 18 if the other powers consent. The revelations of how very faithful to immemorial tradition human nature remains as soon as the sentiments of patriotism or prestige are touched has necessarily shaken faith in the universal brotherhood idea. And without convincing proof of the sincerity of the universal brotherhood idea the confiding process of throwing away the sword becomes unthinkable. To the old-fashioned thinkers of the Old World it somehow appealed as rather ill-timed that, coinciding with the announcement of the failure of Geneva, the United States Ambassador to the Court of St. James's, back in Washington, should have personally told the President, and the President should have personally told the world, that the peoples of Europe have learned nothing from the war and that their professed desire for disarmament is all eyewash. Coming in conjunction with Senator Borah's preposterous motion to try and add to the overwhelming burthen of this country by a heavy indemnity for American losses incurred through the blockade before the United States entered the war, the reflection is instinctively conjured that there are indeed some things which Europe has not learned from the war, and that the methods of the New World are in the very forefront of these lost lessons.

That the solemn dignity of Brazil should exercise a depressing influence upon the May Conference on the preliminary consideration of a further limitation of armaments there really is no reason to believe. But the very blunt criticism of Mr. Houghton is quite another matter. The great powers could limit their armaments with absolute indifference as to whether Brazil insisted on maintaining her own *status quo* or not. But they could not possigly further limit their naval armaments if the United States, after preaching the ideal for so long, proclaimed her intention of having nothing whatever to do with any international understanding upon the subject on the eve of an assemblage at Geneva—or anywhere else for the matter of that—convened for the purpose of discussing the details of such an understanding.

At the moment of writing we have no means of knowing what may be passing between the various Chancelleries on the subject of the projected disarmament conference. But I think we may take it that the "atmosphere" for disarmament—or, more strictly speaking, for limitation of armaments—has been rendered very damp for a long time to come. Mr. Houghton's "message" will be taken to heart by all the nations which it may concern. He pays a passing trigute to the "honesty" of this country, but immediately goes on to say that we are too much involved with other European powers to give effect to our own aim of purpose. In other words, we do not assume a pose of superior aloofness.

The idealists will be immensely, sincerely disappointed. But I wonder whether the idealists represent such a large proportion of the nation as we are sometimes invited to believe. The economists certainly represent the bulk of the nation. The view of the bulk of the nation is that anything in reason which will help to curtail our colossal burthen of expenditure is justified. They are in sympathy with the idea of disarmament only to the extent to which it means saving money. The "golden dream" of universal pacificism does not appeal to the prosaic everyday world. No country wants war for the sake of war. But every country wants to be in a position to take her own part. Every country wants to negotiate with other countries

on a footing of being able to maintain her prestige, and in this immemorial world there is only one means by which this can be assured—armed strength.

When Mr. Lansbury and his eighteen Socialistic *confreres* proposed to abolish the navy during the debate upon the Estimates by a simple motion to do away with the personnel they merely made themselves objects of ridicule. Not only have the people of this country no earthly idea of doing away with the navy; they are not at all enthusiastic over the proposal to reduce the navy. They certainly want to reduce expenditure. That is quite another matter. But they realize very fully what they owe to the navy, and how dependent they are upon the navy. More than that, they are intensely proud of the navy. And although £58,400,000 is a big price to pay for pride, yet in his heart-of-hearts the average Briton thinks it is well worth it, and would very much sooner see the costly fetish of "social reform" go by the board than sacrifice a single cruiser.

The League of Nations is a fine conception. So was the Hague Convention of pre-war days. But would the former really prove of more practical avail than the latter did when national sentiment began to boil? The League of Nations admits that its "sanctions" can only be rendered effective by an adequate backing of armed force. A situation may easily arise when one of the peoples who maintain a considerable portion of this backing of armed force not only decline to use it in support of a "sanction" but clamor for the employment of it against that sanction. We have already seen Turkey snap her fingers at the League of Nations, and Italy shrug her shoulders with barely concealed contempt. The beatitudes of Geneva are ethically beautiful, but the great mass of civilized humanity is impervious to beatitudes when they run counter to the wish that is father to the thought.

There are a good many—probably a vast many—of us who think the world went very well before we deemed the time had come to hail all men as brothers, and therefore as equals. America will have none of it, and, without any reference to the sentiment which prompts this attitude, I find it difficult to deny that America is right. The "under dog" doctrine does not ring true. Just as it is pure bosh to say that all men are equal, so it is equal bunkum to say that all nations are equally to be trusted. The under dog is very docile while he is trying to paw his way up abreast of the top dog, but it is the docility of a selfish purpose to serve. There are nations today which would be very glad indeed to see Great Britain disarm down to the level of their own strength—simply for the love of Great Britain, of course!

Idealism in this imperfect world is synonymous with the French idiom *laiser faire*. It means a comfortable negation of the battle of life. Mr. Ramsay MacDonald pretty well defined it when he used the term "golden dream." That this should appeal to humanity at large it might seem reasonable to believe. But we know perfectly well that it does not when we come to the test of practical application. Brazil scattered all the glamor of Geneva, and between them Mr. Houghton and Senator Borah have very effectually dispelled what remained of the golden mist. We are now back to stark realities—if, indeed, we had really ever got away from them. Nor would it be surprising if the reactionary pendulum should take a pretty wide swing before it spends its momentum. The growing dissatisfaction at the restrictions imposed by the Washington Conference in the land if its conception, the United States, may quite conceivably result in a proposal that it should be abrogated. Just as America had no hesitation in disavowing the League of Nations after she saw it a *fait accompli*, so is it equally possible that she may give notice to terminate the Washington Agreement as imposing too much upon her policy of world aloofness.

We certainly do not want to see a return to naval competition on unre-

stricted lines. But I think that common sense and financial stringency are quite as good a guarantee against this as any international compact. Germany, with her overweening ambition, set the pace in pre-war days. At the present time there is no naval rivalry in Europe. France and Italy have voluntarily reduced their naval programs to a bare minimum of defensive requirements, and not on account of any international agreement. Our own standard of strength has been steadily ebbing for some years past. Naval policy is the material expression of the political situation. The League of Nations aims at reducing the political situation to a sort of amiable uniformity; to discipline peoples like schoolboys. Well, it has just failed, and the United States Ambassador to the Court of St. James's has proclaimed to the world that Europe is a hopeless medley.

And so any real hope of disarmament has receded; perhaps only temporarily; perhaps indefinitely. Economy must find some other subject than the navy—and goodness knows there are plenty of them. I confess I get a trifle tired of the insistent repetition these days that we are armed against nobody; that we mean no harm to anybody; that, in fact, we wouldn't hurt a fly. Why protest so much about it? We are armed to protect ourselves against those who would not be very backward in taking advantage of us if we were not. We are armed to keep the pacifists from starving. All this self-righteous deprecation seems to me to be so unnecessary, so undignified. Much more to the point would it be, were there any need to apologize for the fact at all, to do so in the language of Mr. Micawber and say "We are armed because—in short, we choose to be!"

There is current a parrot-like phrase to the effect that we can no longer continue to live alone in the world. Now, what in the name of the great auk does this mean—if it means anything? Was this country ever so great, ever so prosperous, ever so much respected, as when she was living alone in the world in the sense which some of our benign statesmen now declare to be impossible? We hear a lot of bunkum about "self-determination," but nothing about our right to manage our own business in our own way. We might take a leaf out of Mr. Houghton's book.

Admittedly all this is political, but it has a very direct interest for the navy. The idea of yielding our freedom to build exactly what ships and guns we may consider necessary has certainly never appealed to the navy. The Washington Agreement has not stopped competition at all, but merely diverted it, which is, perhaps, the only reason why it has lasted so long as it has. Lord Charles Beresford's apothegm that "battleships are cheaper than battles" is the only sane philosophy for this country. Mr. Chamberlain came back from Geneva with sorrowful talk about "a tragedy." The simple truth is that he was struggling against a sense of humiliation. Since he personified Great Britain, the spectacle was not one to please our national pride. Yet it is the sort of thing we must expect if we are going to embrace in brotherhood all sorts of nations which scarcely trouble to conceal their contempt for the process and are only concerned with the measure of advantage they can gain from this new phase in the history of a people which became great by rather different methods. Well, we shall see what happens at Geneva on May 18 next. Not a few level-headed people believe it will be a repetition of what happened at Geneva during the Ides of March.

The Ship of Heresy

By Sir Herbert Russell, *The Naval and Military Record*, 24 March.—No subject can become trite so long as it continues to hold the live seed of legitimate controversy. We have had a great deal of discussion of late—indeed, practically since men found time to talk generally of things after the end of the war—as to the value of the capital ship. Much of it has been

closely thought out and soundly reasoned. Some of it has been very superficial, serving no further purpose than to tend towards confusing a perspective already sufficiently beset with complicated and conflicting conditions. The late Admiral Sir Percy Scott stultified his own very opportune question by his manner of asking it. He had condemned the battleship as no longer of any avail in the face of the submarine and the aircraft. He failed to carry competent concurrence because his contention was wrong. The battleship can quite well take care of herself against the submarine and the aircraft. Relatively, she is much better able to do so today than she was ten years ago; hence it is clearly a mistake to argue that she has been rendered impotent by these modern developments of sea warfare.

As a fighting machine the capital ship remains mistress of the seas. But the real problem lies in defining the degree and direction of her capacity to reign. She perpetuates tradition in that she is designed to act with a group, and not by herself, and that the main objective of that group is the crippling or destruction of the enemy's chief concentration of sea power. As a battleship her business is to give battle. Failing opportunity to do this, she must be employed to immobilize the enemy who declines to accept battle. It is reasonable to assume that an equal desire to attempt decisive results in a grand clash is never likely to exist in opposing fleets; there are bound to be inequalities in material, in morale, in situation, which will make one leader less keen to accept battle than the other leader is to force it.

I think the growth of the capital ship has gone a long way to accentuate this. Prudence is the handmaiden of genius in warfare, and no admiral is going to lightly risk such a large embodiment of his total strength as the battleship of today. The risk itself has multiplied so enormously. Cornwallis off Brest, or Collingwood off Cadiz, had only to keep out of range of shore batteries to be assured of no molestation in their blockading tactics so long as they could continue to keep the sea. Only the blockaded fleet could threaten them, and this was the one threat they courted.

Close blockading of this character is now impossible—that is to say, by ships-of-the-line. It has been eliminated from the functions of the capital ship by the methods which science has conferred upon the weaker side, and which enable him to lurk in his lairs as long as he chooses. But he cannot be permitted to lurk in his lairs uncovered, otherwise he may break out when he pleases and do immense damage. So the strategic problem has become how to contain a weaker enemy who declines to come forth and accept battle in a manner that shall be effective. In the late war we saw how this problem materialized. But we must remember that we were favored by strategical conditions which we can hardly hope ever to see repeated, Nature having placed us right astride the main gates of the enemy.

It is claimed that the battleships of the grand fleet justified themselves during the Great War by covering the operations of the mobile units, primarily engaged in protecting trade and guarding the passage of troops in the Narrow Seas. Covering them against what? Against the enemy battleships, I suppose. The grand fleet did not prevent enemy cruisers and destroyers and submarines from issuing forth when they wanted to do so. It was our own cruisers and destroyers and submarines which did this. We know very well that if the high seas fleet had not been beneaped in the Jade when the Heligoland Bight action was fought (a misfortune due to British foresight) German battleships would have rushed to the spot, and Jellicoe, four hundred miles away, could have done nothing to cover the British force. For the high seas fleet was never blockaded; it was widely contained.

This plea that the grand fleet performed its part by "holding the ring" against the enemy is, of course, justified by the fact that he possessed battleships which had to be covered. Would he not have been better off had he

possessed no battleships at all? For I am assuming that in this case we should have possessed none either, since the capital ship is a pure product of competition. Are not covering operations a form of passive warfare calculated to prolong hostilities indefinitely—in fact, to leave it to other factors to work out the issue? Taking this view, do they represent the most effective method of employing the vast measure of fighting resources which they keep merely watching and waiting?

Let us assume that on the outbreak of the Great War neither side had possessed any battleships, e.g., ships designed to act in fleet formation and dedicated to the ultimate purpose of meeting, defeating, or disabling the main fleet formation of the enemy. Suppose the ratio of naval strength had been in the same proportions, but that instead of being expressed in the monster ships committed to rigid tactical ideas this had been embodied in small, mobile types. To be definite, let me presume that the maximum on either side was a warship of 10,000 tons. I eliminate the word cruiser, because the warship to which I refer would be the primary unit of the fleet, and we may therefore call her a capital ship if we choose.

What would have been the situation under such conditions? The question gives wide scope to tactical students. My own impression is that we should have seen much the same position as actually developed; the superior force seeking to contain the inferior force by commanding dispositions on the outbreak of hostilities. If we admit this we also admit that the monster battleship was not necessary to covering purposes. But I think there would have been very much more "liveliness," and that by getting on with the war more rapidly we might have shortened it. I think that in place of a most laborious, top-heavy "order of battle," evolved in the event of a meeting which only took place at all by accident there would have been more seeking of opportunity on both sides.

The fact is that weapons have been developed to a stage at which they stultify themselves. Just as an army is very soon reduced to static warfare, so is a battle fleet soon restricted to comparative immobility. It has been contended that the grand fleet was never reduced to immobility; it was always free to come and go. There were a good many "sweeps," it is true, which disconcerted the enemy not in the least, since it mattered not to his lurking fleet whether it was "covered" from the anchorages of Rosyth and Scapa, or by squadrons steaming in stately array past the fringe of the Heligoland minefield.

Down to the advent of the dreadnought—that ship of heresy—competition in battleship design had moved along lines of comparative moderation. For about fifteen years the 12-inch gun had been accepted as the standard of adequacy, and displacement had only increased by about 20 per cent. The all-big-gun-ship was one of those spectacular fallacies which a spirit of rivalry occasionally produce. She was proclaimed as the result of the "lessons" of Tsushima. Those "lessons" resolved themselves into a simple demonstration of the fact that the heavy shell hits the smashing blow—not an altogether new revelation. The dreadnought did not deliver heavier shells; she merely delivered more of them. Two and a half times the primary battery power of the two-turret battleship was concentrated in her hull. This was accomplished on an increase of only about 1,500 tons displacement upon the *King Edward* class. But clearsighted men immediately realized the inevitable result of this step. Great Britain, which should have been the last country in the world to give any encouragement to international naval competition, imparted a tremendous impetus to it from a "start level" position. We know the consequence.

The doctrine of possessing the most formidable warship in the world naturally appeals strongly to the popular fancy. We are all, very properly,

immensely proud of the *Hood*. We know that she can steam forth and declare herself sovereign of all she surveys. No other single ship in the world can dispute her prowess. No other ship is going to try. Therefore, what becomes of her proud superiority? She can only assert her dominance when it comes to be disputed. If nobody will dispute it she must make herself useful in a humbler capacity than metaphorically shaking her tremendous fist at the bare horizon, thereby representing sheer waste of power.

War is no longer likely to be an affair of decisions between organized armed forces as the ultimate end, although there must always be the essential means to the ultimate end. It will resolve itself into a struggle of national endurance, in which the economic element will be even more important than the military element. All great naval powers are great commercial powers, and therefore largely dependent upon their sea-borne trade. The nation that has the longest economic life is the nation that is going to win the war. For this country numbers form the essential keynote to trade security. The doctrine of concentrating the greatest measure of power in the fewest number of hulls is a complete inversion of the true principle. The axiom that we must build ships to beat the enemy is a rather dangerous fallacy. We had done this in preparation for the Great War, and the enemy simply declined to come out and be beaten. So the grand fleet "covered" him, and meanwhile his campaign against our commerce brought us perilously near to defeat.

So long as any other sea power maintains capital ships we have no choice in the matter. But I do not think the other sea powers are wedded to the battleship. France and Italy have practicaly renounced her—for economic reasons it is true; but, then, economic reasons are a determining factor in war endurance. Japan, I believe, is only waiting for a lead. The views of the United States I do not profess to know anything about, but the battleship is of less value to her than to any other naval power owing to her lack of bases and remoteness from all possible rivals. For ourselves, I think the policy of encouraging the abolition of the capital ship may be taken as a foregone conclusion.

Oil in the Far East

By Louis E. Nantz, North China *Star*, 28 Feb.—Changing conditions are nowhere more apparent at the present time than in the oil industry of China. This commodity undoubtedly represents the largest individual business in the Orient, and it is controlled practically by two large western combines, the Standard Oil Company of New York and the Asiatic Petroleum Company (China) Ltd. The former is an American and the latter a British enterprise. There are a few independent importers and one other American firm of considerable importance in the southwest of America, the Texas Company. Their business, however, is not of sufficient importance to threaten the solidly entrenched positions of the two large combines which, it is understood, operate on a price agreement basis. That is, each company agrees to quote certain prices, and to notify the other in the event of a reduction. It is also understood that these two companies are sufficiently powerful to force any other oil importers in on the price agreement, thus eliminating the one imported commodity, which is an essential of the people, from the realm of open competition and placing it definitely in the hands of a small group who fix prices irrespective of the law of supply and demand.

The Standard Oil was the first in the field and for several years had an undisputed market, and as usual in such cases its scale of prices was fixed so high, and profits were so great that the eyes of oil operators all over the world were fixed longingly toward the inexhaustible wealth of the flowery kingdom which could be gotten for barrels of oil delivered at regular

intervals. The Asiatic Petroleum Company, a huge European combine with extensive interest in the Near East, under its various producing and manufacturing names has, by judicious marketing ability, and intelligent advertising built up a trade in China and the rest of the Orient which is estimated to be equivalent to one-third of the whole.

This enormous business was acquired only after the most unintelligent and long drawn-out fight between this firm and the Standard Oil. At one time, in 1916 or 1917, they were selling oil in the Yangtze Valley for much less than the actual freight rate from the United States to the Orient. This rate war terminated with a rate agreement, or a gentlemen's agreement, regarding prices to be charged and also the amount each company was to sell in various territories. Prices of oil products have since that time remained more or less stationary, the fluctuation being unimportant. The Texas Company, another American concern, has made its appearance on this market and has developed a not inconsiderable trade in kerosene and gasoline. However, this company, in common with many other American firms in the Orient, is carrying on business in rented buildings, including godowns, depending on local equipment for handling its products and in all probability appears to the natives of the country to be of a temporary nature.

The third group, and likewise the third phase of oil in the Orient, can be briefly glimpsed in press reports and in the pages of the Chinese Maritime Customs reports. Press reports from Tokyo indicate the completion of the organization for the development of the Saghalien Oil Fields. Just a glance at the names making up the personnel of the new exploitation company is sufficient to indicate its soundness. The company is organized with a capital of Y.10,000,000 in 100,000 shares subscribed for by six companies, the Nippon Sekiyu Kaisha, the Kuhara Mining Company, the Okura Mining Company, the Mitsubishi Mining Company, the Mitsui Bussan Kaisha, and the Asahi Oil Company. The names of at least five of these companies are well known in the Orient and are synonymous with accomplishment and success, and one of them, the Mitsui Bussan Kaisha, is experienced in handling oil in China. The Mitsui people were the agents of the Texas Company for several years in China, and placed that company's products first before the Chinese people. Mitsui and Okura together, probably have three hundred different agencies and branch offices throughout China. If they have decided to ally themselves with an organization that has for its object the manufacture and distribution of petroleum products, they will naturally turn to China, the world's greatest market, and with their organizations and experience will constitute the most formidable rival yet known to western traders.

During the year 1924 there was a total of fifty gallons of kerosene oil imported by Japanese, into this district.

During 1925 there was a total of 1,103,388 gallons imported by Japanese into this district and up to the present moment the customs daily returns show an amount of 50,250 gallons imported. This would indicate that a market is gradually being developed with a view to marketing the products from the Island of Saghalien as soon as production permits, which, to judge by the character of the firms behind the enterprise will be in the not distant future.

CURRENT NAVAL AND PROFESSIONAL PAPERS

"The Lighting of the London Continental Airway." *Aviation*, 5 April.

"Air Mail Service." *Aviation*, 5 April.

"The 'Air Transport' Number of *Aviation*," 5 April.

"Internal Combustion Locomotives and Vehicles." *Mechanical Engineering*, May, 1926.

"Swedish Shipping in 1925." *The Nautical Gazette*, 24 April.

NOTES ON INTERNATIONAL AFFAIRS

FROM APRIL 3 TO MAY 3

PREPARED BY

PROFESSOR ALLAN WESTCOTT, U. S. NAVAL ACADEMY

UNITED STATES

FRENCH AND JUGO-SLAV DEBT AGREEMENTS.—An agreement for funding the French debt to the United States of about $4,000,000,000 was finally reached on April 29, after negotiations in which Ambassador Berenger offered increases in the initial and total payments to meet the demands of the United States Debt Commission. The agreement calls for a total payment of $6,847,104,000 in sixty-two years. The payments during the first ten years are $35,000,000 less than was offered by Mr. Caillaux, but the total is $627,000,000 greater.

No interest is charged during the first five years. After that the interest if averaged would amount to 1.58%. The present-day value under this arrangement reckoning interest at 4¼% over sixty-two years, is about 50% of the principal, as compared with 26% for the Italian payments, and 78% for the British. It is believed that the agreement will be ratified in the U. S. Senate by a majority about the same as that given to the Italian accord. Both France and Jugo-Slavia are said to be seeking $100,000,000 loans in the United States.

The Jugo-Slav debt of about $63,000,000 was funded by an agreement on May 1 which provided for payments over sixty-two years amounting in present value to about 32% of the debt.

SENATE APPROVES DEBT AGREEMENTS.—During the latter part of April the U. S. Senate approved the debt agreements with Italy, Belgium, and Czechoslovakia. After considerable debate and opposition, the Italian agreement was passed by a vote of 54 to 33.

NO U. S. DELEGATES TO WORLD COURT CONFERENCE.—On April 19 Secretary of State Kellogg sent a note to the League of Nations in reply to the invitation to send delegates to a conference at Geneva on September 1 to consider the reservations made by the United States in its offer to participate in the World Court. The note stated that the United States would not send delegates to this conference, and would carry on direct exchange of notes with the member nations, although no objection was made to a conference among the member nations themselves.

"It would seem to be a matter of regret," wrote Secertary Kellogg, "if the Council of the League should do anything to create the impression that

there are substantial difficulties in the way of such direct communication as an exchange of notes. The Senate reservations are plain, and according to their terms they must be accepted by the exchange of notes between the United States and the forty-eight member nations before the United States can become a party and sign the proctocol."

NEW TACNA-ARICA PROPOSALS.—In view of the increasing unlikelihood of a satisfactory solution of the Tacna-Arica dispute by a plebiscite, especially on account of the difficulties raised by both Chili and Peru, the U. S. Department of State on April 15 made a new set of proposals for a settlement, as follows:

The Secretary of State has the honor to suggest that in the interest of international peace and a cordial rapproachment between the parties they consider the advisability of a mutual and joint sacrifice whereby either:

1)—The territory of Tacna and Arica shall be constituted a neutralized state, either independent or under the protectorate of South American states, as may be agreed, or—

2)—The provinces of Tacna and Arica shall be transferred (upon an apportionment of equitable compensation, and appropriate economic arrangements, to be agreed upon) to a South American state not a party to these negotiations.

As neither party is willing to surrender the territory in question to the other, and as a proposal for the division of the territory between them has been rejected; the remaining opportunity for a solution of the long-standing controversy would appear to be found in one of the suggestions above made or in a modification thereof if such is deemed advisable.

It was later reported that both Chili and Peru felt keenly the desirability of a peaceful settlement, especially since the South American states have long supported the principle of arbitration of international difficulties, and that therefore there was a fair prospect that the proposal of a neutralized state might be adopted.

GENEVA MEETING ON LIMITATION OF ARMAMENT

FRENCH POLICIES STATED.—The American delegates to the preliminary conference on limitation of armament set to meet at Geneva on May 17 sailed from the United States late in April. The delegation was headed by Hugh Gibson, U. S. Minister to Switzerland, with Major General Dennis E. Nolan as chief army adviser, and Rear Admiral Hilary P. Jones, Rear Admiral Andrew T. Long, and Captain Adolphus Andrews as naval advisers.

The French policies to be advocated at Geneva were stated as follows:

(From Baltimore *Sun* of May 2).—The French thesis is two-fold. First, it maintains that no discussion of disarmament can be allowed to affect the Treaty of Versailles. It contends that Germany's disarmament after defeat is an especial case to which the armament of other nations cannot be assimilated and that two ideas of disarmament must be closely defined.

The definition that France suggests is certainly ingenious. It is based upon three factors: First, security; second, indistinguishability and solidarity of all sorts of armament, naval, military, and aerial, and, third, war potentiality. They are systematicaly expounded as follows:

The disarmament of any nation must be in proportion to its security or, in other words, by its geographical position. A country whose security is threatened either by its disadvantageous geographical position or by a powerful and turbulent neighbor ought not to be disarmed in the same measure as a country that enjoys good natural frontiers or is surrounded by weak pacific nations.

All kinds of armaments, whether land, sea or air, must be taken equally into account in appreciating the armament of any country. This formula speaks for itself. If Great Britain or America asks why France has so large an army France will retort "Why have you so large a fleet."

In estimating the measure of any country's armament account must be taken not only of the number of troops or the amount of war material it possesses, but also its war potentiality; that is to say, the total of all forces, military, economic, industrial, that it is capable of bringing into play. This formula means that the smaller the proportion of its population engaged in industry, the smaller its resources in munition making and, therefore, the larger its army should be. Thus France would be allowed to maintain a larger army than any of the other great countries like America, Great Britain, and Germany.

GREAT BRITAIN

COAL STRIKE THREATENED.—Complete paralysis of British industry was threatened by a miners' strike set for May 3. The strike would affect about a million miners, backed up by some 200 unions and 5,000,000 workers in other fields.

On April 30 the government issued a proclamation declaring a "state of emergency," which by the Act of 1920 gave the authorities power to use all state resources to protect the nation's vital interests. Troops were sent to coal areas, and the government prepared to take over transportation and supply services and control of coal.

From Baltimore *Sun*, May 2:

Although the nationalization of mines is the avowed aim of the miners and also the Labor Party, this is not the present issue. The miners have made no demands, but have stood on the defensive with the motto phrased by their secretary, "Not a penny off wages, not a minute on working hours." It was their refusal to budge from this stand that led Premier Baldwin to declare that the government was unwilling to continue the subsidy which it has been paying since last August to prevent a coal strke, and which today has cost the taxpayers £23,000,000.

The owners demanded general and sweeping reductions in wages, amounting in some cases to 20 per cent and bringing the wages of some men with families down to $5 a week. The alternative was for the men to accept an increase in the working day from seven to eight hours, and if this were agreed to the owners said they would keep the wages at their present level.

FRANCE

FRENCH FINANCE BILL PASSED.—The new French Finance Minister Raoul Perèt succeeded early in April in winning the approval of the French Chamber for his finance measure providing for the balancing of the budget and a total tax increase of about four billion francs. The financial problem had been before the Chamber since last July and had caused the resignation of five finance ministers and the fall of Painlevé's ministry and Briand's

first cabinet. About 58 per cent of the reserves provided will be required for payments in the French foreign and domestic debt. The bill passed the Senate on April 29.

In April also the campaign was begun to wipe out the French debt by voluntary contributions, and large contributions were made by financial and political leaders. The committee for this purpose was headed by Marshal Joffre.

PEACE CONFERENCE WITH RIFFS.—During the last two weeks of April peace negotiations were held at Oujda, in Morocco, between representatives of France and Spain acting together, and the Riff leader Abd el-Krim. Delay arose over the Franco-Spanish demand for immediate release of prisoners and the immediate advance of French and Spanish troops into territory held by the Riffs. The French and Spanish troops, however, advanced while the negotiations were going on.

The peace terms called for recognition by the Riffs of the sovereignty of the Moroccan ruler, and for the exile of Abd el-Krim to France under a pension from the French government. The Riffs were given until May 6 to accept the terms offered, but the prospects of acceptance appeared unlikely.

FRANCO-RUSSIAN DEBT NEGOTIATIONS FAIL.—After two months of fruitless discussion, Franco-Russian debt negotiations in Paris were brought to an end on April 24. Russia would make no offer for settlement of the debt to France, amounting to about 32 billion paper francs, unless France offered immediate further loans.

GERMANY

RUSSO-GERMAN TREATY.—The text of the recently negotiated treaty of amity between Germany and Soviet Russia was made public on April 27, and copies were sent by Germany to other European powers. The treaty is in brief a five-year agreement giving mutual assurance of neutrality in case either nation is attacked by another power or coalition of powers. The provisions are as follows:

Article 1—The basis of relations between Germany and the Soviet Union remains the Treaty of Rapallo. The German Government and Government of the Soviet Union will remain in friendly contact with one another in order to insure mutual understanding in all questions of a political and economic nature affecting their two countries.

Article 2—Should one of the contracting parties, despite its peaceful demeanor, be attacked by a third power or by several other powers, the other contracting party shall preserve neutrality throughout the entire duration of the conflict.

Article 3—Should a coalition among other powers in connection with a conflict such as is foreseen in Article 2, or at a time when neither of the contracting parties is engaged in warlike activities, be organized for the purpose of imposing an economic boycott against one of the contracting parties the other contracting party will not participate in such coalition.

Article 4—This treaty shall be ratified and ratification proclamations shall be exchanged in Berlin. The treaty thereupon goes into effect and is valid for a period of five years. The two contracting parties will reach an understanding over the further status of their political relations before the termination of this period.

An appendix to the treaty consists of a letter from Foreign Minister Stresemann to M. Krestinski and the Russian Ambassador's reply. It is declared categorically that these communications have equal force with the treaty proper.

Although the treaty is evidently the result of Russia's efforts to protect herself in view of Germany's alignment with the Western powers at Locarno and in the League, the letter of Foreign Minister Stresemann accompanying the treaty attempts to show that Germany's pledges in the treaty will not run counter to her obligations as a League member. Dr. Stresemann states in his letter that Germany as a League member "would oppose any policy directed solely against the Soviet Union"; and that punitive undertakings against the Soviet Union under Articles 16 and 17 of the League Covenant "could be contemplated only if the Soviet Union started an aggressive war," and could be decided upon "with binding effect for Germany only with Germany's consent."

The communications accompanying the treaty and having equal force with it, provide for the future negotiation of an agreement to settle disputes between the two nations by arbitration.

ITALY AND SOUTHEASTERN EUROPE

Attempt to Assassinate Mussolini.—Premier Mussolini narrowly escaped death on April 7 when a demented woman—Violet Gibson, sister of Lord Ashbourne of Ireland—fired several shots at him as he was being cheered by a street crowd. One bullet slightly wounded the Premier's nose.

Italian Premier's Voyage to Tripoli.—On April 8-17 Premier Mussolini voyaged to Libya, the Italian territory in Tripoli, on a dreadnaught, and was received with honors on African soil. "My voyage to Libya," declared the dictator, "contains no menace. In spite of the pageant presented by our warships, my voyage is merely a matter of prestige. We wish to concentrate our attention on our colonies, to make them better known, better appreciated, and better developed. But I refer only to the colonies we possess."

In the colony he spoke as follows:

My voyage must not be interpreted as a mere administrative act, but as it is—an affirmation of the power of the Italian people, a manifestation of the force which originates in Rome and which extends from Rome to a glorious and triumphal littoral.

Fascist Italian Tripoli! You represent here Italy which is daily more prosperous and powerful. Rome carries the beacon lamp of strength to the shores of the African sea. No one can stop our inexorable will.

You understand me more for what I have not said than for what I have said. Only this language is possible in Fascist style.

BRITISH DISCOUNT ITALO-TURK SCARE.—

The alarm and uneasiness reported in Turkey over Premier Mussolini's tour of Tripoli and over rumors that an Italian-Greek compact had been drawn up, are not shared by officials of the British Government.

All responsible comment regarding Italian affairs is usually accompanied by reservations such as, "It must be remembered that Mussolini is an incalculable quantity."

Nevertheless, officials say, it is impossible for the British to believe that any Mediterranean power, in giving expression to a new spirit of nationalism, would run the risk of action likely to precipitate serious trouble.

The prompt denial by the Greek Foreign Minister of the existence of an Italian-Greek compact against Turkey is accepted in London and is believed to have had a quieting effect in the Near East. The general view here is that danger of war is not great at present, if only because of the financial and economic exhaustion of the countries likely to become involved.

There is a keen understanding among British officials of the peculiar character of public opinion in Southern and Eastern European countries, a public opinion which is vastly different from that of the United States or Great Britain; but it is hoped here that Turkey, as well as Italy and Greece, will reduce any sword-rattling to the absolute minimum necessary to maintain confidence of the respective peoples in their existing régimes.

Turkey's new levy of army conscripts had been regarded in various quarters as giving substance to recent rumors of contemplated Italian or Italo-Greek aggression at Turkey's expense.

It is estimated that the men called to the Turkish colors yesterday, added to those already summoned in connection with the Kurdish trouble and the Irak dispute with Great Britain, will bring the Turkish army to about double its normal peace strength of about 120,000 officers and men.

Premier Mussolini's recent speeches and his reference in February to "Italy's Napoleonic year" is being interpreted, not only in Turkey, as seriously aggressive and as suggesting an intention to achieve colonial expansion in Anatolia, which is declared to be his aim.

Recently London newspapers have printed rumors of an alleged design by Mussolini to enlist the support of Greece for his imperial ambitions. These rumors alleged that Greece, through long credit contracts with Italy, would purchase rifles, tanks and other munitions which could be used against Turkey in Thrace while Mussolini was taking action in Asia Minor.

Athens, April 19 (AP).—Foreign Minister Rouplos today denied the report of the existence of an agreement between Italy and Greece against Turkey.

Constantinople, April 19 (AP).—The newspapers describe the situation arising over possible Italian aggression against Turkey as much more reassuring. In their opinion it is becoming evident that the Italian objectives are Somaliland and Abyssinia rather than Anatolia. The alarm of the past few days, therefore, is slowly subsiding.

NEW RULERS IN GREECE AND PERSIA.—On April 18 General Pangalos took oath of office as President of Greece. He declared that on the next day he would relinquish the dictatorial powers assumed in January and govern by constitutional methods. Gen. Pangalos had had himself elected president two weeks previously by a vote in which there were no opposition candidates.

In Persia on April 25 the new ruler, Reza Khan Phelevi, crowned himself as shah in the presence of his ministers, and declared a week of celebrations.

POLISH PREMIER VISITS AUSTRIA. From *N. Y. Times*, April 16.

Vienna, April 15.—Count Skrzynski, the Polish Premier, arrived here this morning on a two days' official visit, during which he will sign a new arbitration treaty with Austria and open negotiations for improving trade relations.

These treaties, however, seem convenient excuses for, rather than the real objects of the political negotiations now going on in the Ballhousplatz, where Count Skrzynski, as an official of the old Empire, got his first training in diplomacy. The real objects why Poland is cultivating the friendship of Little Austria, *The New York Times* correspondent learns from well informed Polish and Austrian sources, are double.

Through closer relations with Austria, Poland hopes to have Vienna become the intermediary between Warsaw and Berlin in settling the differencies between them. By thus showing the Austrians that their position, historically and geographically, allows them as an independent state to continue to play an important influential and political rôle in Central Europe, Poland hopes to discourage the anschluss movement which would make Vienna merely another provincial German capital.

The impulse behind Count Skrzyski's visit in both regards, but especially in the latter, comes, the Poles unofficially admit, directly from Dr. Benes, the Czecho-Slovak foreign minister, and behind him from France. Both seem to realize that mere treaty prohibitions are insufficient to prevent Anschluss in the long run, and that Austria, to conserve her independence, must have both a reason for wanting to conserve it and the possibility of doing so more easily.

Poland's impasse with Germany helps to provide a reason.

FAR EAST

PEKING EVACUATED BY FENG'S FORCES.—During the first part of April Peking was evacuated by its defending forces in the face of advance and bombardment by the troops of Chang Tso-lin from Manchuria and also the armies of Wu Pei-fu marching northward. Prior to evacuation the Feng forces sought to come to an understanding with General Wu, and with this in view forced the resignation of President Tuan Chi Jui and set free his predecessor, Tsao Kun. Their efforts, however, were a failure. In the absence of recognized authority, a committee of ten Chinese, including six former premiers, attempted to preserve order in the city. Having defeated the Feng forces, it remained to be seen whether Wu and Chang could come to an amicable understanding.

BOOK REVIEWS

BOOK DEPARTMENT

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MODERN HARBOURS—By Commander E. C. Shankland, R.N.R. (Chief Harbor Master and River Superintendent of the Port of London). James Brown & Son, Glasgow, . . . 21/-net

REVIEWED BY REAR ADMIRAL A. P. NIBLACK, U. S. NAVY, (RETIRED)

Modern Harbours fills a real gap in technical seafaring literature and is of interest to naval officers as giving many important notes on pilotage, salvage, handling of large vessels in tide ways and canals, turning circles, anchorages, moorings and many other questions of practical seamanship. From the moment a ship gets into touch with a radio station, until she enters a harbor and is again outward bound, coastal and harbor pilotage and the operation of port facilities are therein thoroughly described.

Navigation on the high seas, dealing as it does with so many variables, is a science of approximations, but, when a ship gets into pilotage waters, this book enumerates the accurate aids which she has at her command. While it is a compendium of up-to-date information on coast pilotage, harbor engineering, hydrography, hydrology, seamanship, coastal and port signalling, salvage, insurance, harbor regulations, port facilities, safety precautions, meteorology, docking and berthing, and the general question of harbor conservancy, it contains much more than the average sea captain is apt to know, but which the selected captains of the largest ships of the merchant marine all do know. This is not implying that going to sea is a rule of thumb business, or a trade, for it is actually an art requiring, and responding to, keen intelligence and brains. The risks and hazards of the seafaring life give the sea captain a sense of humor, for he knows that in fog, rain, mist, falling snow or rough weather, those who administer the ports and operate the facilities are usually on a snug eight hour-a-day basis, or working on a daily routine, while he is living on the bridge and grateful for a helping hand. We are made aware by the author of the recent development in radio in direction finding; fixes by radio compass; broadcasted notices to mariners; storm warnings; radio telephony from light-ships, lighthouses and shore

stations; sound-ranging for preventing collisions at sea, radio beam transmission; echo soundings; echo detection; submarine signalling; time signals, and leader cables. As the author says:

> The functions of a ship may be said to consist of (1) overseas navigation, (2) coastal and inland navigation, (3) harbourage, (4) docking, (5) to lie afloat for discharge and or (6) loading of cargo, and (7) dry-docking for overhaul and or repairs to hull. Of these seven functions five are within the jurisdiction of a port, its Board, Commission, or Authority.

At the present moment, the great increase in displacement, draught and speed call for a revision of the hydrographic safeguards to navigation and improvements in port facilities, and we may confidently look forward to several international conferences to bring about these results, especially in the matter of greater uniformity.

The author says "Modern harbours of the British Empire and of other countries do not differ in detail to any great extent; they are, on the contrary, similar to a marked degree." The reviewer cannot agree with this statement as he has carefully perused most of the sailing directions of the world, and is, at present, engaged in tabulating all the data therein relating to buoyage and buoy lighting, storm warning, and coastal and port signals for use in international conferences, as showing the appalling lack of uniformity in aids to navigation. As an illustration, the buoyage of the British Isles is under three different services, viz., Trinity House Corporation, the Northern Lighthouse Board, and the Commissions of Irish Lights. Under the Trinity House jurisdiction alone there are three hundred local lighthouse authorities in England and Wales regulating upwards of a thousand buoys and beacons. These local authorities may change at will the color of the channel buoys, as the rules governing the British buoyage system prescribe only that the starboard hand buoys, on entering, shall be conical, and port hand buoys flat top or can shaped. Nearly every port in the British Isles has a different system of port signals, traffic signals, docking and berthing signals, tidal signals, and nearly every lighthouse and light-ship has a different system of danger, warning, and lifesaving signals.

The ports of the world are "similar to a marked degree" only in that they have an entrance channel, anchorage ground, berthing and docking facilities, a signal station, a pilot boat, a quarantine station, a custom house, and a harbor master's office, but in other respects they are comparable to the Tower of Babel. There is so much that is beyond criticism in this book that one may take slight exception to some of the conclusions without diminishing its value. For instance, just as the gyro compass has not really done away with the magnetic compass, which is still required as a check, so are visual signals still a necessary check on radio and other new aids to navigation. The author's enumeration of the advantages of employing pilots gives as one argument "changes in lighting and buoyage are frequent in some harbors," but he leaves out the most important one which is, that the insurance companies require that a pilot be taken. The exemption of ships, in Great Britain, from taking a pilot, under the Pilotage Act of 1913, includes

men-of-war, pleasure yachts, fishing vessels, certain types of ships of under 3,500 tons, etc., but it is just these classes of ships that need the visual marks, which are different in nearly every port of the world.

The author, naturally, has the harbour master's view, which is that any facilities provided by the port authorities should be satisfactory even if the seafaring people for whom they exist are not consulted. There is also a tendency on the part of the pilotage organizations to favor diversities, as it encourages their employment. When these "trade union" pilot organizations have their meetings the proceedings are generally secret, which makes it appear that the shipowner's view is not necessarily considered. In the particular case of the Port of London, a ship leaving Tilbury Docks is required to take a pilot out into the Thames River; then another pilot for ten minutes down to Gravesend, and a third pilot to take the ship to sea from Gravesend. All this is under the superintendency of the author.

Any attempt on the part of international uplifters to bring about uniformity in all aids to navigation will receive the hearty support of shipowners and insurance companies, but will not find a friendly reception with those who are responsible for the present diversity which requires the average mariner to either take a pilot or carry a large library around with him to acquaint himself with the vagaries of every port in the world.

The reviewer can cheerfully recommend *Modern Harbours* as the most welcome and valuable contribution that he has yet encountered on the subject of not so much "going to sea" as of coming in from sea.

VIGNETTES OF THE SEA. By Felix Riesenberg. Harcourt, Brace & Company, New York. $3.00.

The author of *Vignettes* is an officer of long and varied experiences at sea and is therefore entitled to speak with authority of things pertaining to blue water. He is a graduate of the Schoolship *St. Mary's*, and a product of that nautical educational system, which was founded by Admiral Luce in the seventies. Captain Riesenberg has served in the Revenue Marine, Merchant Service, and Coast Survey. He was with Wellman in the Arctic in 1907, and navigated the first dirigible to attempt to reach the Pole. Besides being a seaman, he is a qualified writer on nautical subjects.

It is not surprising then to find the tang of salt in his stories, which he has collected in the volume under consideration and appropriately terms *Vignettes of the Sea*. The book will find favor with all those who are fond of ships and sailors. There are more than three score sketches mainly of personal experiences in wind jammers, when sails survived steam in a few water bruisers, and only served to remind deep water sailors of the glory and glamour which ever belonged to tall ships.

There are also latter day stories of the liners, and the new ways of those who go to sea now-a-days and find new poetry and romance in the engine room, like McAndrew. There are a few yarns which he has had from old shell-backs, the Revolving Parrott for instance, and a description of

Sands Street that is the best thing in the book. It is not to be expected that the same level is maintained in all the stories; some are much better than others, and one cannot help suggesting the pruning knife might have been used to the advantage of the collection.

The author has a clever knack of disguising his stories by unusual titles. Who would guess what follows under "Bibles in Hell Gate," "The Chain Letter," "A Railroad Sea Story," "The Revolving Parrott," etc.? He gives a personal touch to the book by mentioning names of those with whom he has served and who have shared his life at sea. In this respect the volume is in a manner a graceful tribute to shipmates, a sort of Hail and Farewell, as it were.

It is one thing to be able to tell a story, and quite another to write it. According to Mr. Christopher Morley, who contributed an enthusiastic preface, Captain Riesenberg is a splendid raconteur; and *Vignettes* proves that he can write as well as talk, but even he cannot convey by signs and symbols the picturesque objurgatory powers of the average sailorman. Who could ever write the yarn of the *Mozambique,* and do justice to the early English profanity of the first mate, Mr. Simmons, by asterisks and dashes?

In the last chapter Captain Riesenberg mentions a number of sea books which have entertained him. As far as it goes, the list is very good, although some of the titles are not familiar. On the other hand, he might have included John M. Spears *Port of Missing Ships,* Pierre Loti's *Iceland Fisherman,* and *From Lands of Exile;* and for those who prefer reading French, *Combats et Batailles Sur Mer,* by Farrère and Chack. Poetry, however, lends itself better than prose to the lure of the sea, and I would add to Captain Riesenberg's list, Alfred Noyes' *Drake, Poems Old and New,* and *Admirals All,* by Sir Henry Newbolt; and last, but not least, John Masefields' *Sea Poems,* especially "Sea Fever."

G.

THE CONSTITUTION OFF TRIPOLI IN 1804

EDITOR'S NOTE.—The following letter was printed in two issues of *The Repertory*, a newspaper published in Boston, Mass., under date of March 12 and 15, 1805. The letter is reprinted here through the courtesy of Captain Thomas Frothingham, U.S.R., of the Military Historical Society of Massachusetts. The original newspapers containing the letter have been deposited with the Naval Historical Foundation, as a gift from Captain Frothingham. In granting the Naval Institute the courtesy of reprinting the letter, he wrote: "Enclosed is a letter from Tripoli, written by Morris in the *Constitution*, in 1804. It is full of the spirit of the old Navy and it strikes me as very suitable for the PROCEEDINGS to publish. There is a curious old print of the bombardment of Tripoli here in the Marine Museum [of the Military Historical Society of Massachusetts]. I might be able to get a photo of it for the Institute to use with this letter." The print referred to was secured and is used as the frontispiece to this issue.

Through the courtesy of Louis H. Bolander, Assistant Librarian of the Naval Academy Library, the following information is furnished regarding the writer, N. Morris:

NOADIAH MORRIS

Chaplain, 5 July, 1803; Purser 10 December, 1803. Last appearance on records of Navy Department 4 October, 1806, Dead.

(Hammersley's *List of Officers of the Navy of the United States and of the Marine Corps, from 1775 to 1900*—pp. 392)

In a letter addressed to Commodore Preble at the time of his retirement from the squadron, and dated 4 November, 1804, the name of N. Morris, purser, appears as one of a group of officers signing the letter. (Goldsborough's *Naval Chronicle—Vol 1*, pp. 242-3)

In a *List of officers retained in the Navy after the passage of the Peace Establishment law of 3 March, 1801*, the name of Noadiah Morris appears as one of a group of four chaplains. (Goldsborough's *Naval Chronicle—Vol. 1*, pp. 393)

Report of Memorial of Prudence C. Loring, by Senator J. D. Williams, April 17, 1840. Senate Documents, No. 398, 26th Congress. 1st session, Vol. 6. Adverse to claim for pension for death of her husband, Noadiah Morris, a purser in the Navy in 1808. (A descriptive catalogue of the government publications of the United States, 1774-1881, by Benjamin Perley Poore, pp. 401)

LETTER

From an officer of the Mediterranean Squadron
United State Frigate *Constitution*,
off Tripoli, 7th September, 1804

Dear Sir,

I improve the opportunity of the prize Brig *Scourge's* going to the United States, to give you an abstract of the proceedings of

the American squadron before Tripoli, since the 25th of July, at which time the *Constitution, Vixen* and *Nautilus* arrived from Malta towing six gun, and two mortar boats, and was joined on this station, by the *Syren, Argus, Scourge* and *Enterprize.*

—27th all the squadron came to anchor near the town of Tripoli, and all hands employed in preparing for a general attack, but was obliged a few hours afterwards to get under way, the wind having veered to the N.E. and blowing a heavy gale on shore, we stood off, and could not again approach the coast till the 3d of August, when being within three miles of the town, wind S.E., the signal was made for action, and you can hardly conceive with what promptitude the several preparative signals were answered and executed. At half past two the action was general, the *Constitution* within musket shot of the Batteries, which could bring eighty pieces of heavy cannon to bear on her, the bombards in a position to send all their shells into the town, and the six gun boats covered by our brigs and schooners bravely engaging nineteen gunboats, two gallies, a schooner and a brig within the harbour, and in pistol shot of the Bashaw's castle; in the heat of this doubtful conflict, the *Intrepid,* Captain Decatur with his division of three boats, bore down on a division of the enemies boats seven in number, and fought them hand to hand under the walls of their castles, and in view of twenty-four thousand Arab and Turkish soldiers, and hauled down four of their flags, three of which boats were brought out, the other boat got into the Mole, after treacherously killing Lt. James Decatur after their flag was struck.

Capt. Somers who commanded the leeward division of three boats was equally intrepid, but not so successful. One of his boats was disabled early in the action, and another from some almost unaccountable reason, did not come into close action; but this brave officer alone attacked five of the enemies' boats, and obliged them to haul off, and run into the Mole, where all their boats had taken shelter in a shattered condition, and we have since learned, with a great proportion of men killed or wounded—we must account for this great slaughter from their boats being full of men, and our boats reserving their fire 'till close along side, and their guns loaded with forty pounds of musket balls each—the three boats captured were mounted with new brass Spanish pieces 13 feet long, and carrying a ball of 28 pounds—the carnage on

board them was very great, out of 52 prisoners one half were covered with sabre and pike wounds. Capt. Decatur boarded and carried two of them and received but one slight wound, though his life was twice saved by his gallant tars. Lt. Trippe boarded and carried the others, but received eleven sabre wounds, none of which however proved mortal; he is again at his duty.

Never was there a more complete victory—to recount every instance of personal bravery would be to name almost every officer in the squadron.—The Turks were driven from their batteries in the greatest terrour and confusion; and I think I may say with propriety, that since Charles the 5th of Austria never have any of the Barbary States met with so severe a check.

The *Constitution* suffered some in her spars, sails and rigging, a shot in the center of her mainmast I fear has done it considerable injury; it has been strongly fished.

Fourth, 5th and 6th in continual preparation for battle, but weather unfavourable. The wind to the Northward of East, heaves such a swell on shore as to make it improper to attack.

7th wind favourable but the Tripoline gun boats &c. not inclined to give us battle, our gun boats now nine in number and two bombards, ran in and attacked the town to the Westward, in order to entice the enemies' boats out, but without effect—they however sustained a heavy fire for four hours from the town forts, and a severe gun battery on the beach, which they succeeded in silencing—the two bombards commanded by Capt. Dent and Lt. Robinson, did great execution in the town—one of our prize boats unfortunately blew up; and Lieutenant Caldwell who commanded her, Mr. Dorsey, midshipman and seventeen men lost their lives—a Mr. Sprague midshipman and ten men who were stationed forward, to load and fire the gun, were not injured, and while all the stern of the boat was blown off, and actually sinking, they finished loading their gun, and just in the act of touching the match, the boat sunk under their feet, while this brave young officer, and his gallant comrades, gave three cheers, and plunged into the sea, but they were fortunately all saved by the small boats. Independent of those which were blown up, we had but two men killed and several wounded during this action, at the close of which the *John Adams* hove in sight.

On the 8th there were overtures made by the Bashaw through the French Consul for an accommodation—but before I give you

these proposals, it will be well to take a retrospect of circumstances which precede this event.—Several months past at the intercession of our Minister at Paris, Bonaparte was induced to interfere for the liberation of our prisoners in Tripoli, and about the same time, the Court of St. Petersburg, interceded thro' the medium of the Ottoman Porte for the same purpose: but with the intercession of these two most powerful Governments in Europe, a ransom could only be obtained, but by the payment of 500,000 dollars down at the liberation of the prisoners. These were the only terms this haughty Bashaw could accede to, and induced there was a great deal of acrimony, between the French Consul at Tripoli (who was the mediator) and Commodore Preble because the latter would not honour these terms with his immediate coincidence, which he contended would be thought honourable by the greatest maritime powers in Europe. But our intrepid Commander determined to oppose to this unwarrantable demand, the emulative bravery of his Officers and Seamen: and the event proved the fallacy of the idea, that these Barbarians were invincible, for in the short space of seven days our little squadron fought off 350,000 dollars of this insolvent demand—Yes Sir, peace and ransom were offered for 150,000 dollars—by which you will discover the contest ceased to be a point of honour; nothing was asked for peace or tribute, of course it became a point of humanity—the 150,000 dollars ought to have been given, without hesitation, and so it would, had not the *John Adams* at this moment arrived, and announced the coming of four more Frigates, for the declared purpose of dictating terms to these barbarians. Our Commander not knowing the expectations of Government on this head, could not accede to these terms at the moment such force was expected. The consequences that would have attended such a measure were but too obvious; the conclusion would be, that if our frigate could command these terms, five would certainly force a peace and ransom for little or nothing—But for my part I cannot but think, that the only alternative left our Gallant Commander, was an unfortunate one, and I firmly believe that altogether they will not command much better terms—under these peculiar and disagreeable circumstances, Commodore Preble could not accede to the terms with honour to himself. But he offered twenty thousand dollars as a present in addition to eight thousand which he had previously offered (and was

rejected with disdain both by the Bashaw, and French Consul) but this offer was not acceeded to, and we have since the 7th of August been constantly prepared for action, and as often as the weather would permit been under the batteries of Tripoli. You can form no idea of the rigour of this service, officers and men are worn out for want of necessary rest—never was there a greater emulation in any service, no altercation but what has arisen from who should have the most chances of meeting danger and death. We have repeatedly driven the Turks from their batteries, have attacked their boats &c. at their moorings, and sunk many of them, and in fact no means by which they could be distressed have been neglected. We have in all, between 40 and 50 Seamen and Marines killed and six officers, as follows—Capt. Somers of the *Nautilus,* Lieut. James Decatur of the *Nautilus,* Caldwell of the *Siren,* Wadsworth of the *Constitution,* Israel of the prize Ketch *Intrepid,* and Midshipman Dorsey of the *Siren.* This loss is severe from the uncommon merits of the officers; but it cannot be considered as a large number when we reflect that we have been exposed to the fire of 115 pieces of heavy cannon from the different Castles and Forts of Tripoli; a brig, a schooner, two gallies and nineteen gun-boats—The squadron generally have suffered in their rigging, and sails and spars; the *Constitution* has received upwards of 40 heavy shots, besides a great number of Grape.

It is peculiarly unfortunate that the *John Adams* left her gun carriages on board the squadron at Hampton Roads, to be brought out by them; had she brought them out herself there is not a shadow of doubt but we should have effected a ransom and peace within 48 hours after her arrival, and for the last mentioned sum of 100,000 dollars. One frigate beside the *Constitution* at that moment would have been fully competent to the accomplishment of so desirable an object, but the *J. A.* was of no service: the Commodore however received great support from the Commander Capt. Chauncy, who volunteered with a number of his officers and men on board the *Constitution* and gun-boats—The squadron have been daily and hourly expected since her arrival but have not yet made their appearance; and the Commodore has found himself under the necessity this day of returning the gun and bomb vessels to the King of Naples, as the weather has become boisterous, and too uncertain for boats of their small draft of water on a lee

shore, that have no other shelter than the stern of our vessels, which would be found insufficient to save them in a Northerly gale, which we have great reason to expect on the seas, approaching the Equinox, independent of which, we have expended nearly all our ammunition.

It is impossible to ascertain how many of the enemy have been killed during these several engagements, but I think I may safely say thousands—and the Bashaw has only been deterred from acceding to the last mentioned terms, from a belief that our gun and bomb boats could not keep the coast much longer—that Tripoli has been reduced to the last extremity there is no doubt, and I am sanguine in my opinion that if the Frigates arrive soon, we may yet have a peace this fall.

We are informed that government is fully apprized of the merits of our commander and that they have given frequent and unquestionable proofs of their approbation. Yet the officers of this squadron cannot but regret the necessity of superceding him in a command which has reflected so much honour on his country by the intrepidity which has marked all his measures, and for the field which he has opened for his young officers, to assert and support the innate principles of Americans, and which cannot fail of impressing all Europe with sentiments of the highest respect for our growing naval characters.

I have entered so fully into the operations of our Commodore, for these six weeks past, that I hope to be excused for adverting to many circumstances, previous to this sanguinary warfare, in my opinion equally honourable to his country and himself. You have been fully apprized of the honourable peace he made with Morocco—our government generously approbated his conduct, and I can only observe, that this event has been brought about by his ready conception of the Turkish characters, which has been but too long mistaken, however the Commodore's object accomplished he lost no time in sailing to join the *Philadelphia* and *Vixen* in the blockade of Tripoli; between Algiers and Malta, he met the unwelcome news of the loss of that frigate, which wrested from him almost a certainty of making the same honourable peace with Tripoli, that he had a few days before made with Morocco—This unfortunate event placed our affairs with that regency in quite a different point of view; and the Commodore shifted his

course for Syracuse which was previously fixed upon as a place of rendezvous for the Squadrons and deposit of provisions. We arrived there the last of November, and after procuring the necessary stores and arsenals sailed for the coast of Tripoli, where we encountered heavy gales of wind, and a tremendous swell setting on shore, but on the 23d of December, we captured a vessel with a number of Tripolines on board, among which were some officers of distinction, after this we returned to Syracuse, and the Commodore embarked on board the *Vixen* for Malta, for the purpose of getting some Turkish letters translated and to fix on some plan of supplying our unfortunate countrymen in Tripoli with money and other necessaries; from which however they were long withheld either thro' the . . . . or . . . . of the American Consul at that place—It was during the time the Commodore was at Malta that indirect proposals were made him for the ransom of our prisoners for 400 dollars each, and the restoration of the *Philadelphia* for a schooner. Of this circumstance I see [by the newspapers] the publick are apprized, and I presume ere this that they are informed of what followed—It was by mere chance while at Malta, that the Commodore learned that this pretended desire for an accommodation, was nothing less than a deep laid scheme to prevent any plan he might have formed for the destruction of that Frigate, until they had carried into effect, a contract then existing between the Bashaw of Tripoli, and Bey of Tunis, the nature of which was, that the Bey of Tunis was to give two Xebecks of 24 guns each for the frigate *Philadelphia* at her moorings in the harbour of Tripoli, where he was to send officers and seamen from his regency and bring her out under Tunisian Colours; of the truth of this, I believe Doctor Davis [then charge of affairs at that regency] will readily subscribe to—The Commodore convinced of this pernicious design sailed immediately for Syracuse, when he formed the plan for the destruction of that frigate which was so nobly executed by the gallant Decatur.—This event is attended with greater and better consequences than will naturally occur to those who are not acquainted with the particular relative situation of the Barbary states—The main force of Tunis (which is but too large already) would have been augmented by a valuable frigate while that of Tripoli would have had an addition of two large Xebecks, completely armed and while the squadron were

blockading Tripoli they would have sailed from Tunis unsuspected, nd ere we had been apprised of the circumstance, the commerce of the United States would have suffered incalculable injury, as they would have been permitted to carry their prizes into either Algiers or Tunis—The existence of these States depend in a very great degree on each other—that their manners and customs are the same, there is no question, and that their strength and arrogance has rather proceeded from the duplicity of the Maritime powers of Europe, than from any superiority in bravery or enterprize is equally certain.

The truth of this has been fully demonstrated by our small squadron. The Americans have conquered them, hand to hand, one to five; and they have reduced the insolent demand of the redoubtable Bashaw to the standard of reason.

Soon after the destruction of the *Philadelphia,* the movements of the Tunisians, wore the appearance of hostility towards our commerce. Commodore Preble in the course of the spring, was three times in Tunis Bay—to the impression of this vigilance and the efficient operations against Tripoli, are we at this moment indebted for his Beyship's forbearance—it is a fact that the Bey of Tunis has it in his power to injure our commerce more fatally than any other State, they have sixty four cruisers and ten gun boats, as follows.

1 Frigate of 36 guns ready for launching.
1 do. of 36 do. ready for sea.
2 Xebec's of 36 do. do. do.
1 do. of 32 do. do. do.
9 do. from 30 to 24 guns each ready for sea.
10 do. from 16 to 12 do. do. do. do.
10 do. from 10 to 6 do. do. do. do.
30 gallies from 1 to 2 guns each, carrying from 30 to 40 men.
10 gun boats carrying 50 men each.

Independent of which, their position is infinitely more favourable to success than Algiers or Tripoli—I would refer you to the Mediterranean Chart, where you will discover that its continuity to the principal maritime ports in the sea, fully justifies the idea.

Commodore Preble's exertions have not been confined simply to the prosecution of war against these barbarians; for while at Naples, negotiating for the gun and mortar boats, he found that

our Commerce at that place, was shackled with the most injurious requisitions—American vessels without distinction of place, or time they left the United States, were obliged to perform a rigorous quarantine of 40 days, after which they are obliged to manifest their cargoes under the most unprecedented restrictions—the commodore presented a memorial to the Neapolitan Government placing this grievance in its true light, contrasting it with commercial privileges other nations had with them, from which we were unjustly excluded—the consequence of this statement was that he had the firmest assurances, that America should have equal privileges with the most favoured nations—whether these honourable intentions are carried into effect, I cannot say, but I am persuaded that from the influence the Commodore has acquired by his correspondence and exertions, will ensure many important advantages to the commercial interests of his country, as it respects the Barbary affairs—a ransom of our prisoners once effected, there is not the most distant idea of their provoking another contest, for in this the Regency of Tripoli is impoverished to the last degree and experience has taught them that they are not invulnerable to American intrepidity.

N. Morris

SECRETARY'S NOTES

Circulation

The circulation of the PROCEEDINGS since January, 1926, has increased 503 copies. During the past month, the circulation has increased 144 copies.

The membership of the Institute has increased, since January, 1926, 257 members, of which 28 joined the preceding month.

The Dardanelles Expedition

The Dardanelles Expedition, by Captain W. D. Puleston, U. S. N., came off the press the past month and is handsomely bound in red buckram. It is dedicated to Major General Hanson Ely, U. S. Army, Commandant of the U. S. Army War College. The regular price of the book is $2.50, but a special price of $2.00 is made to officers of the U. S. Army, Navy, Marine Corps, and Coast Guard, to all U. S. Government Departments, and to all who saw service in the Dardanelles Campaign.

In the preface to the book Captain Puleston states:

"This account of the Dardanelles Expedition is primarily intended for army and naval officers, but it is hoped that it will be found worthy of the brief notice of American statesmen who may be required to direct the destinies of our country in time of war. All three classes are busy men, so the narrative has been compressed and fully illustrated in order that its contents can be quickly understood.

It has been necessary to indicate certain mistakes, which involve criticisms of individuals who played a large part in this amphibious epic. These men, in many cases, had previously acquitted themselves well in smaller undertakings before failing in the mighty struggle for Gallipoli. It may appear useless stirring of dead bones to criticize gallant officers and famous statesmen already forgiven at home, but amphibious war is so certain to play a part in our future national life that the U. S. Army and Navy should study every phase of this great contest.

The illustrations were prepared by Lieutenant Colonel G. L. McEntee, G.S., U. S. A., who also assisted in elucidating the movements of the armies. The author alone is responsible for all facts and opinions given in this book."

The Great Shipping Problem

The leading article in this issue, by Captain Charles Conard, (SC) U. S. Navy, is of timely interest due to the relatively increased importance of the Merchant Marine, not only of our own country but of our competitors. Aside from the economic and political bear-

ings which the Merchant Marine possesses, there is a further bearing, viz., the naval and military. It is this third feature which is of additional and special interest at the present time, involved as it is with future limitation of naval armament by agreement. It was pointed out in these pages last December that, should the time ever come when all forms of naval warcraft, including submarines and aircraft, should be proscribed, the nation which possessed the greatest Merchant Marine upon the outbreak of war would likewise possess the greatest naval strength.

The preceding statement apparently does not appear so simple and obvious to some, as the following comments have been made: (1) that it is hypothetical and has little or no bearing on any possible future conference on the limitation of naval armament; (2) that the Merchant Marine has no bearing upon whether or not the present capital ship is obsolete; and (3) that such obsolescence depends solely upon whether or not there are any remaining strategical or tactical reasons for the employment of said capital ship.

Comment in these pages on (2) and (3) should not be made for obvious reasons, but it might well be asked, "What nation would benefit most if every type of naval warcraft operating above, on, or below the sea should be proscribed?" Would there not then be inaugurated a competition in subsidized merchant ships that no human agency could control?

Professional Notes Section

Commencing with the August, 1925, issue of the PROCEEDINGS, a change was made in the Professional Notes Section, preceding it with a page of "General Arrangement", showing in detail the contents of the various notes under the respective headings, in an attempt to assist the reader. It has come to the editor's attention that many readers are greatly interested in the Professional Notes; that many of them find these notes of as much interest, or more, than the main body of contributed articles. Much time and thought has been spent upon this section, and it has been enlarged somewhat from time to time, and its scope has been widened to include additional subjects of professional interest.

The editor would be pleased to receive comments upon this section from those particularly interested, as to whether or not it

covers the necessary ground, whether it forms the proper proportion of the PROCEEDINGS, or suggestions of any kind which tend to improve its appearance and arrangement. Would it be better to print this section in the same size type as used in the main body of the PROCEEDINGS?

Suggestions Invited

In connection with the preceding paragraph, the editor would be pleased to receive suggestions for improving the appearance, makeup, and arrangement of the entire PROCEEDINGS.

The Financial Strength of the Institute

Many officers of the service do not realize that, were the Naval Institute a profit sharing organization, each new regular member would have to pay approximately $73 instead of the $3.00 annual dues. The Institute's finances are on solid ground, thanks to those who have so carefully guided its financial policy in the past. It is realized by few that your Institute is practically a $200,000 going business concern, its net liquid assets being almost $193,000. These assets will continue to grow from the principle of compound interest if for no other reason provided sound business principles prevail. For example, last year the Institute was satisfied to sell its publications at such prices that it was content with a net profit of $1,015 on approximately $77,000 of gross business, or 1.3 per cent. Nevertheless, surplus was increased by another $8,000 received from interest on bonds and bank deposits, and it is this interest on its investments that will continually augment capital investment and should allow a cheaper and cheaper price for its books, as well as better and better issues of the PROCEEDINGS.

Attention is invited to the above, as it has come to the attention of the Secretary-Treasurer that many officers, when invited to become members of the Institute, have an idea that their financial support is being requested rather than their moral support. While it can never be expected that 100 per cent of all the officers eligible for Regular Membership will avail themselves of this privilege, it is believed that the percentage should and can be very materially increased.

At the present time, the income from the interest on bonds and bank deposits together with the income received from advertising

in the PROCEEDINGS are alone sufficient to permit the PROCEEDINGS to be published at a loss, and the professional books at the small margin of profit previously referred to. It is hoped that members may bring to the attention of non-members the financial condition of the Institute. It is their moral support that is desired, in order that the Institute's mission may be more effectively carried out, and its influence made more widespread.

Captain Cluverius Resigns from Board of Control

In view of his orders to sea, Captain W. T. Cluverius, U. S. N., has resigned as a member of the Board of Control of the Institute, and Commander F. A. L. Vossler, U. S. N., has been selected to fill the vacancy.

Naval Historical Foundation

There was published in the January, 1926, issue of the U. S. Naval Institute PROCEEDINGS Captain Knox's article entitled "Our Vanishing History and Traditions," together with a special notice of the Board of Control, giving publicity to and approving of the idea of Captain Knox and Rear Admiral Strauss that a Trust Fund be created. Subsequently, the Naval Historical Foundation was incorporated and the Naval Institute made an initial contribution of $1,000 to the Foundation. Since the idea of a Trust Fund was first advanced, the Naval Institute has received many letters favoring both the project and the Board of Control's action, and not one single letter expressing disapproval; and this notwithstanding that it has been intimated in these pages that the first $1,000 was considered an original contribution and the Board had under consideration the contribution of a substantial sum.

Wanted: One Copy of "World's Work"—January, 1920

The Institute is desirous of obtaining one copy of the January, 1920, issue of *World's Work,* and will pay for same.

Photos

The institute would be pleased to receive photos of special interest, and, if found acceptable, payment will be made for same, in addition to the usual courtesy acknowledgment when and if published. Officers should have many opportunities for taking pic-

tures of unusual and interesting subjects. Photographs not accepted will not be returned unless return postage is enclosed.

Membership: New members not previously published:

Albrecht, E. P., Mr.
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Snell, Fred, Mr.
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Spring, J. C., Mr.
Seaman, L. L., Major, Surgeon U.S.V. Engrs.
Timolat, J. G., Mr.
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Warren, H. M., Mr.
Wood, Charles, Rev.
Woodson, C. R., Lieut., U.S.N.
Wirgman, F. M., Mr.
Wickham, H. T., Hon.
Ware, Richard, Mr.
Wharton, J. S. L., Mr.
Wittmer, Henry, Mr.

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United States Naval Institute Proceedings

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THE DARDANELLES EXPEDITION

By Captain W. D. Puleston, U. S. Navy

A critical study of this amphibious undertaking designed primarily for Army and Navy officers. It is based on official accounts of the British Admiralty, the Turkish General Staff, the Australian Army, the British Parliamentary Report, and the semi-official accounts by General Hamilton, General von Sanders, Admiral Weymss, and Winston Churchill.

The book is illustrated by sixty-eight diagrams, which alone will give a connected pictorial story of the expedition from its inception to evacuation. The text is mainly used to furnish the political background at the various European capitals and to connect up the naval, military, and political events, which so profoundly affected this expedition.

The illustrations were prepared by Lieutenant Colonel G. L. McEntee, General Staff, U. S. Army, from data collected for four years by Captain Puleston. Other Army officers at the Army War College, notably Lieutenant Colonel W. B. Burtt, General Staff, U. S. Army, assisted the author in preparing that part of the text affecting the Army.

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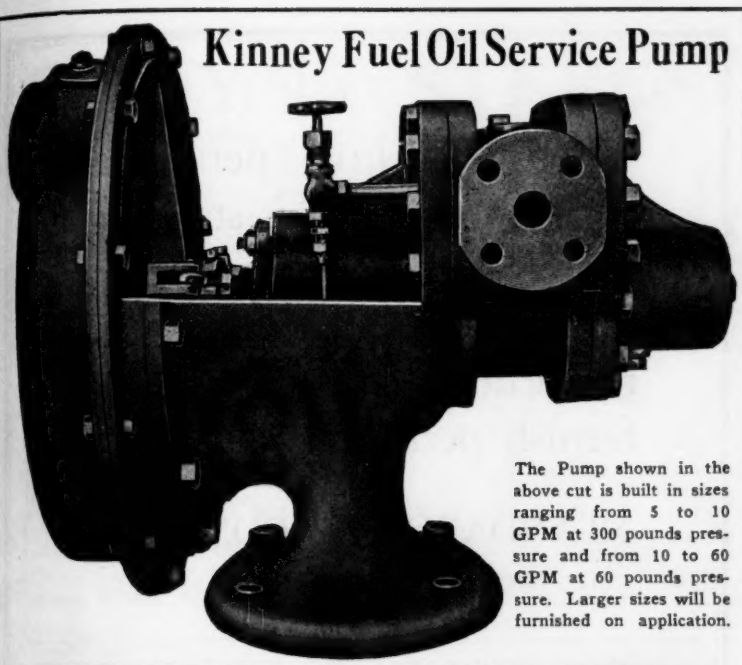

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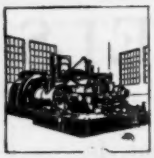

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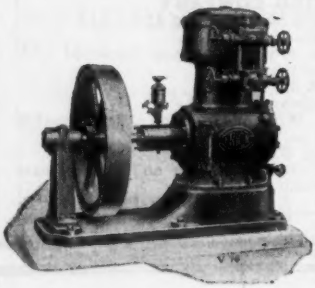

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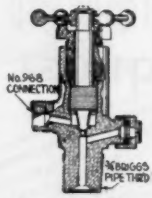

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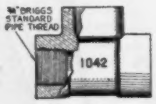

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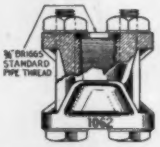

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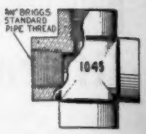

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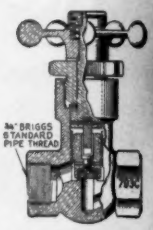

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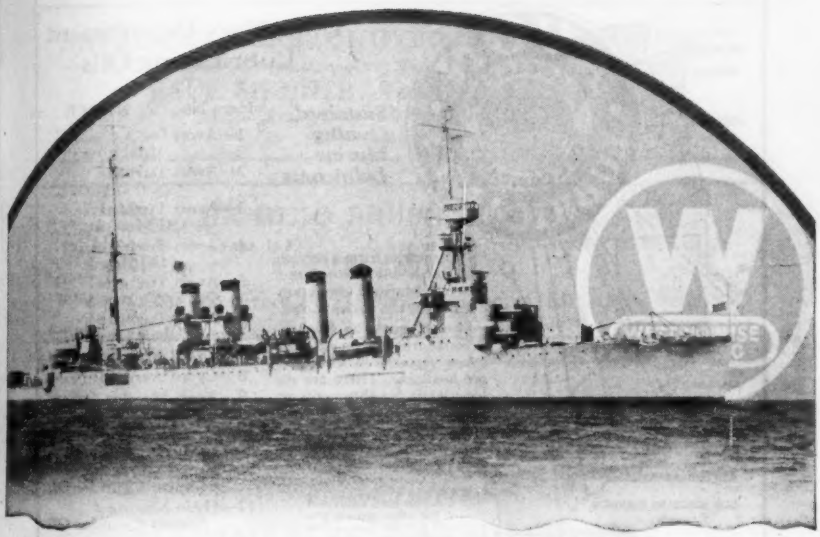

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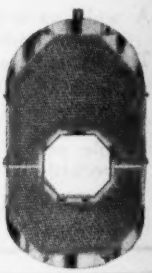

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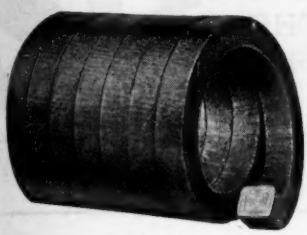

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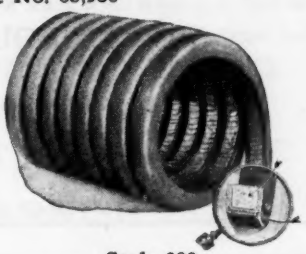

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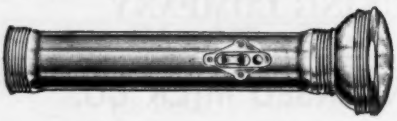

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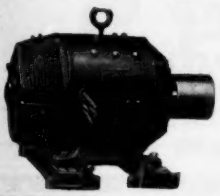

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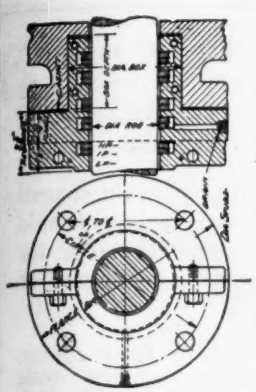

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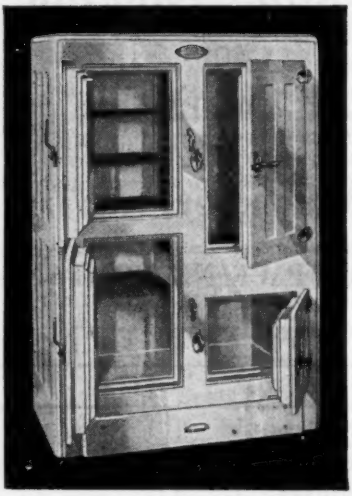

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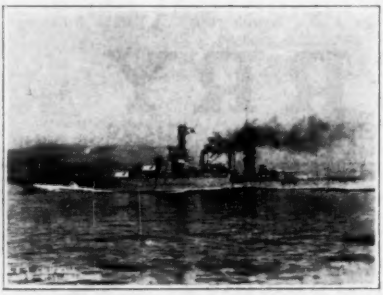

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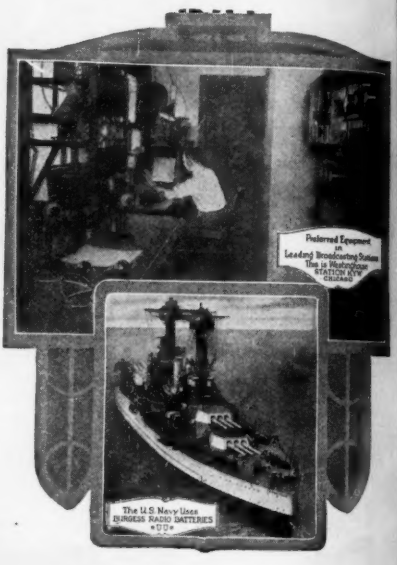
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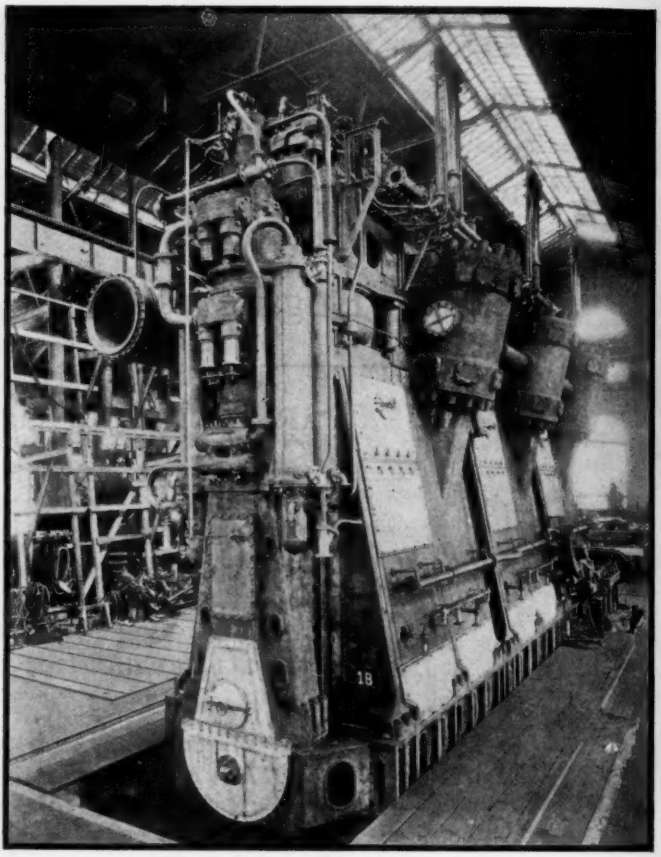

The above illustration shows a 6-cylinder, 2000-S.H.P. Bethlehem large-unit type Diesel oil engine for marine service

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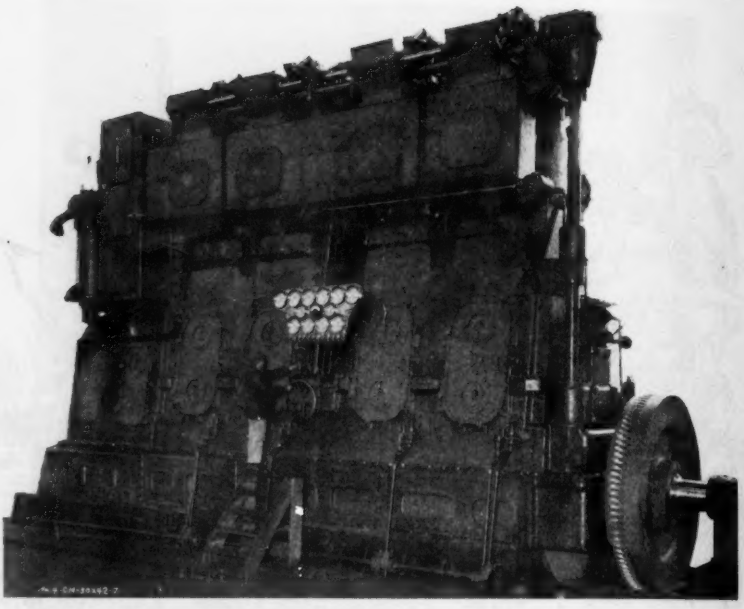

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